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TABLE OF CONTENTS

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Original Articles.

HEMOPTYSIS AS A SYMPTOM.*

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OF the various publications which have dealt with this subject, the monographs by John Ware (On Hemoptysis as a Symptom, from the publications of the Massachusetts Medical Society, Boston, 1860) and by Stricker (Ueber Lungenblutung in der Armee. Festschr. z. 100 jährigen Stiftungsfeier d. med. chir. Friedrich Wilhelm Inst. Berlin. 1895) are especially noteworthy. Of 329 cases of hemoptysis observed by Ware the bleeding was ascribed to tuberculosis in 190, and 62 (18%) recovered without subsequent symptoms to suggest pulmonary tuberculosis. It appears from Stricker's investigation of 900 young and strong soldiers with hemoptysis in the Prussian Army, that of 480 in whom the hemorrhage occurred without recognizable cause or after a "cold," 417, or 86%, were certainly or probably tuberculous; of 213 in whom the bleeding followed the ordinary exertion of military exercise, 176, or 82%, were ascribed to tuberculosis, and of 118 cases in which this symptom came on after more severe exertion (as in the gymnasium, in riding or in swimming), 76, or 64%, were thought to be tuberculous.

In all large series of clinical cases of hemoptysis in which an inquiry is made concerning the proportion to be ascribed to tuberculosis, the question of the relation of a certain number to this disease must remain unanswered without an appeal to more definite data than can be accumulated on patients during life. The frequency with which hemoptysis is not followed by outspoken tuberculosis has made the interpretation of the symptom difficult, and has led to a feeling of uncertainty as to the cause, especially in those cases in which it occurs in patients with good family history, in apparent health and without attendant manifestations of tuberculosis. Although it is apparent from the well-known tendency of tuberculosis to undergo spontaneous arrest that apparent recovery, as in Ware's 62 cases, is not an assurance against this disease as the underlying cause, yet the question of the significance of hemoptysis cannot be answered with assurance without further evidence than this. Stricker's cases, in which the hemoptysis appeared to be due to certain or probable tuberculosis in diminishing percentage as the physical exertion increased, suggest the possibility that exertion itself may be a sufficient cause of the bleeding.

In the attempt to reach a more definite conclusion as to the meaning of this symptom, 549 clinical cases of hemoptysis have been reviewed, and there are included in this number those instances which have occurred at the Massachusetts General Hospital, at the Channing Home and in my private records. In addition to this group of clinical cases, 307 instances of hemoptysis with autopsy have been found in the records of the Massachusetts General Hospital. A useful division may be made between those

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cases in which the bleeding comes out of a clear sky, or when cough and scanty expectoration alone cloud it, and those in which the hemoptysis is but one of the symptoms of pulmonary or other disease. It is of interest also to note the probable frequency of the various causes and to inquire as to the influence of hemoptysis on the course of pulmonary tuberculosis. These matters are discussed under the headings which follow:

HEMOPTYSIS OUT OF A CLEAR SKY.

Excluding from consideration all cases in which the diagnosis has not been established, there are thirty instances of hemoptysis in this group. In these the hemoptysis was an initial event, unpreceded or followed by pulmonary or other symptoms or accompanied only by cough with or without scanty expectoration. In this number are included twenty clinical cases with sputum positive for tubercle bacilli at the time of the bleeding or later in their course. Other clinical cases, of which there are a considerable number with hemoptysis out of a clear sky, but in which definite proof of the cause is lacking, are left out of consideration as of undetermined origin. The ten remaining were autopsy cases and nine, of which three may be mentioned in greater detail, showed obsolete, inactive or active pulmonary tuberculosis. Thus with one exception all the proved cases in this group were tuberculous.

The three cases already referred to may be summarized as follows. One was the case of a man of 46, who entered the Massachusetts General Hospital in 1898 with a history of having coughed up a lump of blood as big as an egg twenty-four years before after rowing a race. The hemoptysis was not preceded or followed by pulmonary symptoms. He died in Hospital following an operation for cancer of the stomach, and at autopsy (274) obsolete tuberculosis of the lungs and bronchial lymph glands was found as the probable explanation of the bleeding. A second instance is that of a woman of 28, who entered in 1896 with the story of having had a hemorrhage two years before while stepping off a car. She began to cough only four weeks before admission and died from a recurrence of the bleeding. At autopsy (XI-204) the lungs showed tuberculosis with cavity formation. A third example is that of a man of 53, who entered in 1915, and stated that twenty years before, for a time, at intervals of every few months, he coughed up a mouthful of blood. Cough did not precede the hemoptysis, but slight hacking cough followed for a few weeks only. There were no subsequent symptoms referable to the lung, and he died in Hospital from perforation of a gastric ulcer. At autopsy (3530) obsolete tuberculosis of the lungs was found.

The single exception to the tuberculous origin of hemoptysis in this group illustrates an uncommon cause. This was the case of a man of 37, who entered the Hospital in 1904 with a history of winter cough without expectoration for three years. He had an abundant hemoptysis three days before entrance, and death occurred two days after admission from a recurrence of the hemorrhage. At autopsy (1196) syphilitic ulceration of the trachea and bronchi, with rupture of a large branch of the pulmonary artery into the right primary bronchus, was found.

Although other causes in rare instances are found in this group, none have come under my personal observation. Authentic examples of hemoptysis from the ulceration and rupture of anthracotic or tuberculous glands into the air passages, echinococcus disease of the lung, new growth of the bronchi and infection with Distoma Ringeri (endemic hemoptysis), may be found in the literature.

To judge from these cases it may be stated as a clinical rule, subject only to rare exception, that hemoptysis out of a clear sky or when cough and scanty expectoration alone cloud it is due to pulmonary tuberculosis. The rule seems to hold as well in those cases in which the hemoptysis occurs during a mild acute respiratory infection, after exertion, moderate injury or without any apparent cause. Exertion of itself cannot be regarded as an adequate cause of hemoptysis, but it may lead to bleeding earlier than would otherwise occur in a patient with tuberculosis owing to the added strain on the walls of blood-vessels already weakened by disease. Initial hemoptysis, even though the only symptom, without subsequent manifestations of pulmonary disease and the maintenance of full health until life is terminated by some other cause, is to be regarded as of probably tuberculous origin. Unless care is exercised in taking the history that all symptoms are included and it is established that the hemoptysis is an uncomplicated event, the situation may be wrongly interpreted. Hemoptysis from pulmonary embolism arising in consequence of latent venous thrombosis, for example, is likely to be accompanied by such other symptoms as dyspnea and pain in the side which serve to suggest that the case belongs in the second group.

HEMOPTYSIS OUT OF A CLOUDY SKY.

Cases in which the hemoptysis is an initial and uncomplicated event, justifying their inclusion in the foregoing group, comprise but a small proportion of the series. Preceding or accompanying symptoms or signs of pulmonary or other disease are more commonly present, and in this group, which may be termed hemoptysis out of a cloudy sky, in contradistinction to the preceding, the causes multiply and all enumerated in the list which follows are included.

THE CAUSES OF HEMOPTYSIS.

Of the various causes in the probable order of frequency, pulmonary tuberculosis doubtless occupies first place in consideration of the high incidence of this disease and the occurrence of

hemoptysis in about 60 per cent. of all cases at some time in their course. It is represented among the 307 autopsy cases at the Massachusetts General Hospital by only 27 cases, owing to the usual exclusion of patients in the active stage of the disease from the wards of the hospital. Chronic passive congestion probably occupies second place, but heads the list of the autopsy series with 105 cases. Then follow lobar (not broncho-) pneumonia, with 100 cases, pulmonary infarction with 48 cases, non-tuberculous pulmonary suppuration with 14 cases, aortic aneurysm with 7 cases, new growths of the lung with 5 cases and ulceration of the trachea and bronchi due to syphilis in one case.

Copious bleeding is seldom seen apart from pulmonary tuberculosis, occasional instances of abscess and gangrene, ruptured aneurysm, and ulceration of the trachea and bronchi. Insignificant hemorrhage and prominence of other symptoms and signs are the usual complex in chronic passive congestion, lobar pneumonia, pulmonary infarction, abscess, gangrene and new growth. Other causes than those enumerated in the list are rare and not found among the autopsied series. They may be grouped for the sake of completeness under such headings as mechanical injuries, toxic agents, such as the fumes of irritating gases, constitutional diseases (hemophilia, leukemia, hemorrhagic purpura and scurvy, animal parasites (pulmonary distoma, hepatic distoma), echinococcus disease (filaria sanguinis, filaria lymphatica), leprosy, actinomycosis and aspergillosis.

Our records are of interest in a negative sense in their failure to confirm the still too prevalent belief that vicarious menstruation is an adequate cause of hemoptysis, no example of which is found in the autopsy series. This and other evidence indicate that it cannot properly be regarded as a cause apart from some pulmonary lesion which is tuberculous in the great majority of the cases. Hemoptysis in the course of disturbances of the nervous system, in patients with the so-called "arthritic diathesis" (Sir Andrew Clark's type) and in those with high blood pressure, is likely to find its true explanation in one of the above-mentioned groups.

INFLUENCE OF HEMOPTYSIS ON THE COURSE OF TUBERCULOSIS.

Finally, I should like to refer to the influence of hemoptysis on the course and termination of the tuberculous cases. For the most part the bleeding is intercurrent and without any appreciable influence upon the course of the underlying disease, but in certain cases the hemoptysis is a direct cause of the fatal termination, the patient dying in consequence of the loss of blood or as a result of suffocation. Hemoptysis was thus an immediate cause of death in five of this series. Of greater frequency and importance, however, is the unfavorable influence which hemoptysis may have on the spread of the tuberculous process in consequence of the aspiration of infected blood into neighboring or remote parts of the lung. This unfortunate occurrence is very clearly suggested in certain instances under observation when patients with normal temperature have hemoptysis and then in the following twenty-four to thirty-six hours the temperature rises and remains elevated until death occurs in the course of the next weeks or months. In this series there are eight cases in which, from a study of the records, the hemoptysis thus seemed to be the determining factor in the fatal termination. The danger of the retention of infected blood and consequent spread of the tuberculous process is constantly to be borne in mind in the treatment of hemoptysis due to tuberculosis, and it seems highly undesirable to use morphia as a routine as is so generally the custom in these cases. If morphia diminishes the irritability of the respiratory tract and suppresses cough, it may actually do harm by leading to the retention and aspiration of infected material and further spread of the disease. It would seem best, therefore, not to use morphia except for such definite indications as an harassing and unproductive cough and extreme nervousness. It is not, I believe, good treatment for the hemoptysis itself.

COMMON SENSE AND CONSUMPTION.

By John B. Hawes, 2d, M.D., Boston.

It has been with the greatest of hesitation that I have written this article. The present status of the early diagnosis of pulmonary tuberculosis by the medical profession as a whole, in this country, is so far from what it should be, and so many unnecessary tragedies are caused thereby, that I should consider it in the nature of a calamity, if any opinion that I expressed could in any way be considered as an argument against making the diagnosis of tuberculosis even in a doubtful case.

The superintendents of the four state sanatoria in Massachusetts, whose advice I asked as to whether or not it was wise to consider the question taken up in this paper, felt very much as I did in regard to it. Their opinions are of interest. One of them says:

"I think we can afford to err on the side of over caution for a while longer in giving advice. To my mind, the most important point to impress on diagnosticians, is the importance of several examinations when possible. Before making a diagnosis in a doubtful case, the general practitioner should be impressed with the importance of symptoms in making his diagnosis, when he is not able to make it by physical signs alone."

Another one writes:

"I do not feel that we are admitting any

patients to this sanatorium who ought not to be here. Of course, we always have a few patients in whom, to our mind, the diagnosis is doubtful. We also have a certain per cent. of afebrile, repeatedly negative cases. Although the diagnosis may be doubtful in a few of these cases, I have always felt they should receive sanatorium treatment for a certain length of time. We have seen this class make rapid improvement following a residence of a few months in the sanatorium, so that they have returned to very active lives."

A third one writes:

"I think that many more physicians are able to make accurate examinations, and to consider carefully the presence or absence of tuberculosis in their patients, than was the case four years ago. Instead of hesitating about telling their patients that they have symptoms of tuberculosis, they are more afraid of not being the first to make the diagnosis. If in doubt they do not delay long before calling a consultant. . . . The physicians, however, need to have brought home to them the difference between infection and disease. . . . Furthermore, physicians in clinics somehow fail to remember that an apparently arrested case may have marked physical signs and always will have, although the individual may have established an equilibrium so well balanced between resistance and disease, that he can enjoy fair health and earn a living. . . . Doctors would make fewer errors in diagnosis if they depended more on symptoms, and placed less reliance on the physical signs that may be present. Physical signs without symptoms can usually be ignored. Symptoms, however, with or without physical signs, need careful study. The cause must be found and suitable treatment instituted as early as possible."

Despite this feeling on the part of these men, however, I believe that it is time for us to stop and consider exactly what we mean by the term "consumption," and exactly what it involves, as far as the patient is concerned, when we tell him that he is suffering from pulmonary tuberculosis.

Four years ago I wrote a paper entitled, "Is the Early Diagnosis of Pulmonary Tuberculosis Being Carried Too Far?" At that time I was struck by what I considered the hyper-conservative attitude taken by many physicians in diagnosing tuberculosis. The reasons for this attitude on their part, as they appeared to me at that time, were somewhat as follows:

"Many wrong diagnoses were being made, and as a result, many non-tuberculous patients were sent to sanatoria and health resorts."

"Such patients in whom wrong diagnoses were made and who were sent to a sanatorium, ran a grave risk of catching tuberculosis."

"Furthermore, it was a great injustice and source of hardship and injury to place on any one who does not deserve what was called the 'stigma of tuberculosis.'"

A few held the view that a diagnosis of tuberculosis is rarely justified unless bacilli are present in the sputum.

"It is not right to 'break up the family' and send away the breadwinner, etc., unless the evidence is positive, and by the term 'positive' is meant 'positive sputum.'"

My own replies to these statements which I made in 1912, differ in certain respects so markedly from the replies which I would make at the present time, as to deserve further comment. To the first statement, that many wrong diagnoses were being made, I gave as my reply at that time that very few wrong diagnoses were made. I gave as evidence the fact that the number of cases at our state sanatoria which were classified as non-tuberculous in that year, amounted to exactly .4%. At the present time, not only is this percentage of cases in our state sanatoria definitely classed as non-tuberculous somewhat larger than it was then, but also our superintendents are coming to feel that it is not purely a question as to whether the patient is free from tuberculous infection, for this in adults would be excessively rare, but as to whether or not he is free from a *tuberculous disease which needs sanatorium treatment.* Looking at the question in this way, my answer would be that there are many wrong diagnoses being made, and that there are many patients in our state sanatoria and elsewhere, who are classified as consumptives, who are undoubtedly tuberculous but are not suffering from consumption needing prolonged sanatorium treatment.

My answer to the second question as to the danger of catching tuberculosis at any institution, is naturally the same now as it was in 1912; namely, that there is no such danger.

To the third question, concerning the amount of injury and injustice done to the patient by calling him a consumptive on insufficient evidence, my reply in 1912 was that I considered the "stigma of tuberculosis" more a term than a reality, and that no harm, either physical or social, would result to a patient sent to a sanatorium because of a wrong diagnosis. This I would change. My feeling in regard to this matter at the present time is different from what it was four years ago. I believe that the word tuberculosis as a result of our active campaign against the disease, does carry a definite stigma, although perhaps more in the mind of the patient than in those around him. I feel very strongly that the physician who makes a positive diagnosis of tuberculosis bears a very grave responsibility, and that such diagnoses should not be made unless based on good evidence and for excellent reasons.

To the last two statements, in regard to making a diagnosis without a positive sputum, and the right or wrong in breaking up a family without a positive sputum, my answers would

be the same now as they were in 1912, so that no discussion regarding them is necessary.

There is a marked tendency at the present time toward the view that the infectiousness of tuberculosis among healthy, normal adults, is not so great as was supposed. While they do not in any way minimize the danger of the active, open case of consumption to children, they do feel that the intelligent consumptive is perhaps not such a source of danger to normal, healthy adults as was formerly supposed, unless the exposure is a prolonged and intimate one. This point of view is welcomed, I believe, by us all. It has been a great problem as to how long we ought to keep in a sanatorium or similar institution, the patient who is running a normal temperature and pulse, and who is healthy in every way except for certain signs in the lungs, and perhaps bacilli in his sputum. Up to the present, such patients have been urged to remain indefinitely on the ground that, as carriers of the disease, they should not be allowed to mingle with their fellow men, any more than a typhoid or a diphtheria carrier. It is more than probable that, except in rare cases such patients should continue to be kept as long as possible.

This question, then, as to what constitutes clinical consumption, needing treatment for a long time in a sanatorium, is one that should be discussed sanely and calmly. In regard to children, we have come to a fairly definite and satisfactory viewpoint. The time is now past when a child is stamped as a consumptive on the evidence of a positive tuberculin reaction, and a few vague and doubtful signs in the lungs. On the other hand, we no longer hesitate to call a child tuberculous and to institute aggressive treatment, when, in addition to a positive von Pirquet test, there are constitutional signs and symptoms, such as loss of weight and strength, ease of tire, fever, debility, etc., without adequate explanation, even if the signs in the lungs are slight or altogether absent. In other words, in the case of children, we have advanced to the point where we base our diagnoses on the study of the child as a whole, and not on the condition of his lungs alone. In adults, the situation is different and far from satisfactory. This is partly because of the tendency of the American public, medical and otherwise, in whatever it undertakes to swing from one extreme to another, and partly, chiefly perhaps, on account of the vigorous educational campaign that has been carried on during the past ten years. We are now reaching a point where it is dangerous for anyone to have a cough or a cold, or to lose weight, because some doctor is sure to shake his head gravely and say that he suspects tuberculosis. Only yesterday, at one of our large Boston clinics, I saw a strong and vigorous young man who had come for treatment of indigestion with no symptoms pointing to his lungs. An eminently qualified physician had made a definite diagnosis of incipient phthisis. The only evidence I could find to support this diagnosis was that years ago, in Russia, a doctor had told the patient that he had weak lungs and that on examination at the present time, there was slight dullness and prolonged expiration at the right apex. My own examination showed nothing abnormal, and yet this man had been definitely stamped as consumptive and referred to a social service department for investigation and disposal. In another similar case, I could find nothing in the patient's history pointing to tuberculosis, except that his wife was now a patient at Rutland. In the record of his physical examination there was "slight dullness at the right apex?" Confirming (?) this there was an, x-ray plate "which shows an active process"! Neither I nor the majority of physicians would consider this sufficient evidence on which to make a definite diagnosis of active pulmonary tuberculosis needing sanatorium treatment, and yet an application had been filed for this patient's admission to a Massachusetts sanatorium.

It goes without saying that this subject must be approached with the greatest caution. Infinitely more harm is done and countless tragedies caused by lack of early diagnosis by the medical profession of today, than is done by making such diagnoses as above mentioned. We must not halt in our efforts to teach physicians and the public how to recognize this disease in its early and curable stages. We must continue our campaign of education and continue it vigorously, so that not only will patients go to the doctors in the early stages, but also doctors will recognize the disease and *be bold enough to say so*, and to institute the proper treatment at the time when it will do some good. In Massachusetts today—and I believe that our standards here are as high as, if not higher than, in any other state in the country in this regard—out of five hundred consumptives in our state sanatoria whom I investigated last summer, nearly *forty per cent.* were told by the first physician whom they consulted, that they did not have consumption, or, worse still, were not told so that they understood it that they *did have* consumption. With these facts staring us in the face, we must be extremely cautious in saying or doing anything that will tend to check the medical profession in its efforts to make early diagnoses of pulmonary tuberculosis.

But at least we can be sane on the subject. As Dr. John L. Morse says in regard to children, "Every child with a cough does not necessarily have consumption, nor does every case of snuffles mean syphilis." Likewise, in adults every protracted cold does not necessarily mean phthisis, nor does everyone who is tired out and who has lost weight and strength have consumption. In the lungs processes characterized by dullness and râles have existed, do exist, and will continue to exist that are caused by pneumonia, influenza and countless other organisms besides the tubercle bacillus. What, then,

should be our standards? What must we demand in the way of evidence before we say that this or that man or woman has clinical, pulmonary tuberculosis? How are we to distinguish between signs and symptoms due to tuberculous infection, and those due to tuberculous disease? In the absence of positive sputum, what evidence must we have before we say that a given area in the lungs, especially if at the base of the lung there are dulness, râles and altered breath sounds, is due to tuberculosis?

These are important and difficult questions to answer. At a recent informal conference of physicians interested in this subject at the Massachusetts General Hospital, Dr. Richard Cabot asked me to state my position in the matter, and to give the evidence I required before making a definite diagnosis of pulmonary tuberculosis in cases without a positive sputum. I told him that I could not give any definite set of requirements, but that each case must be judged on its individual merits. Nevertheless, there are certain general rules which I personally try to follow out. These I would state more or less categorically as follows:

Do not make up your mind beforehand that the case is, or is not, one of tuberculosis.

Do not hurry. In cases where the sputum is lacking or negative, two or three examinations of the patient and many of the sputum are often necessary.

In some cases I am willing to make a positive diagnosis on the history and constitutional signs and symptoms alone, *without signs in the lungs.* Such cases are not uncommon. Likewise, and rather less often, one can safely make a positive diagnosis on lung signs alone without marked constitutional disturbances.

In the vast majority of cases, I demand that there be present both signs in the lungs, generally including râles at one time or another, and constitutional signs such as fever, rapid pulse, subnormal temperature, loss of weight and strength.

Processes at the apices I consider tuberculous until I have proved the contrary; processes at the bases I consider non-tuberculous until the contrary is proved.

A hemorrhage—I do not include as such, minute streaks or flecks of blood in the sputum—in my mind always means tuberculosis until the contrary is proved. This rarely happens. It need not always mean, however, that the patient should give up his work for a long time and go to a sanatorium.

The x-ray gives *confirmatory* evidence which is rarely of great value in diagnosis when taken by itself.

The tuberculin tests I use only very rarely *in adults.* They are of little value and may do harm.

Observations of temperature and pulse, taken at home three or four times daily for three or four days, give evidence of the greatest value.

The most important evidence, and probably most neglected, is that obtained from a careful and detailed study of the patient, his family history, habits, surroundings and occupation.

To sum up then, the diagnosis of early pulmonary tuberculosis or clinical consumption requires patience, perseverance, boldness, and above all, *common sense.*

The physician must remember always that he is dealing with a *human being,* and not merely a set of lungs normal or abnormal.

While the diagnosis may justly be made on signs in the lungs alone, or on constitutional signs alone, in the vast majority of cases there is a combination of both.

It is usually the careful study of the patient's history, his habits, surroundings, occupation, and the constitutional signs and symptoms that he presents, which is of paramount importance and which is most often neglected.

Do not forget that, in doubtful cases, it is possible and often wise, to institute proper treatment and to obtain the patient's fullest coöperation by a few minutes' plain talk, without definitely stamping him as a consumptive.

But above all things, remember that, from the patient's point of view, it is better to be "safe than sorry," better to undergo a few weeks or months perhaps unnecessary treatment as a "lunger" (and to gain physically by so doing), than to linger along in false security until the chances of cure are gone.

SPRAINS AND SPRAIN-FRACTURE OF THE WRIST JOINT.

BY A. C. BURNHAM, M.D., NEW YORK.

THE frequent use of the x-ray during recent years has caused a considerable modification in the diagnosis and treatment of injuries about the joints, but it requires only a short experience in any surgical clinic to demonstrate the frequent errors of omission and commission which are associated with the diagnosis of so simple an injury as sprained wrist.

In the discussion of the injuries with which a sprain of the wrist joint may be confused, there are three general classes of injury which must be differentiated and which may be included under the general terms of sprain and fracture. Even this classification requires further definition, as the terms "sprain" and "sprain-fracture" have been loosely used and are often classed together under the general term of "sprains."

The term "sprain" should be limited to the partial or complete rupture of the ligaments about a joint without luxation of the bones. Should subluxation occur during, and as a part of the mechanism causing a sprain, the condition is essentially a sprain and should be considered as such. The tearing of the ligaments

may take place at any part of the ligament and may be so mild as to cause only a partial rupture of the fibres; or it may be severe enough to cause a complete division of the injured ligament.

If the fibrous band is so firm, however, that a portion of the bony attachment is torn away before the ligament ruptures, the injury is said to be sprain-fracture, and this term has been enlarged to include the tearing away of a portion of bone at the insertion of a tendon by a force which is exerted in such a manner as to tend to tear away the tendon from its bony attachment. The condition of sprain-fracture is, strictly speaking, a fracture, and while it may be conveniently described as a sprain-fracture, it represents pathologically a fracture and is related to a sprain only from a clinical point of view, because of the great difficulty of differential diagnosis.

The ordinary type of fracture is of interest in this connection because, in the region of the wrist, gross fracture is so frequently overlooked. This is more especially true about the wrist joint than it is about other joints, and because of its special surgical significance must be discussed in detail.

Omitting from the discussion the cases of Colles' fracture with marked deformity which reach the surgeon after several weeks or months of treatment as "sprain," there still remain a considerable number of cases in which the x-rays show a distinct fracture, and which lack most of the classical text-book symptoms upon which the student is supposed to base his diagnosis of fracture.

Ross and Wilbert, in 1902, called attention to the frequency of fractures in "so-called sprains" in various joints, and more recently Ross and Stewart (1912) have made an exhaustive experimental study of sprain-fracture and have demonstrated that many, if not all, luxations and subluxations are associated with sprain-fractures or gross fracture. Stern has collected a number of cases of joint injury treated for a considerable period as sprain, in which subsequent examination clearly demonstrated that the original injury had been a fracture. It has been claimed that ninety per cent. of the "sprains" that are referred to the radiographer show fracture.

The writer has limited this paper to the discussion of injuries about the wrist joint, because it is exactly in this joint that most of the injuries occur, and, consequently, in which careful examination will cause most of the errors of diagnosis to be brought to light. The bony prominences about the wrist are freely palpable, and, as x-ray examination is comparatively simple, it lends itself more easily to examination and study than any of the other large joints.

Given then a "sprain" of the wrist, in which the classical symptoms of gross fracture (crepitus, false point of motion and bony deformity) are slight or absent, how are we to differentiate the various types of injury to which the so-called "sprain" may be due? True sprain is associated with the history of an injury which is followed, after an interval varying from a few minutes to several hours, by swelling and pain. The region of the joint is usually tender, but there is special localized tenderness over the ligament injured, and this may be greater or less, according to the extent of the injury. The motions of the joint which put this ligament on the stretch are very painful and the joint may be swollen, due to the accompanying effusion into it. The relation of the location of the trauma, as given in the history, and the point of maximum tenderness, as found by examination, is most important. A fall on the palm cannot possibly cause an injury to the dorsal ligaments of the joint, and the occurrence of acute tenderness on the dorsum of the wrist after such a fall should arouse suspicion of some other injury. In the same manner a fall on the dorsum of the hand, which may cause a sprained wrist, should not be the cause of tenderness along the palmar aspect of the wrist.

In many of these cases the point of maximum tenderness is at or near the attachment of the ligament, and in such patients there may be a sprain-fracture. From cadaver experiments, Ross and Stewart decided that the ligaments were often stronger than the bone at the points of their attachment. In some cases the small detached portion of bone may be felt beneath the finger.

Gross fracture, as has been stated before, is frequently mistaken for sprain. Its detection is usually simple and the diagnosis may be made with the expenditure of a little time and with very slight discomfort to the patient. In the type of fracture commonly confused with sprain, swelling is practically always present, while deformity is absent, or is so slight that its detection is difficult or impossible. Ecchymosis is present, but usually late in making its appearance. Tenderness by direct and indirect pressure is always present, and is most important for purposes of diagnosis. Crepitus and false point of motion are absent or obtained with difficulty. When present they are elicited only by unjustifiably painful manipulations. Measurements usually give no information, the bony prominences retaining their normal relations. Function is usually limited, but in a few cases there is a surprising preservation of the normal movement of the wrist even in a fracture with considerable displacement.

We have, then, the same symptoms associated with the non-deforming fractures about the wrist joint as are found in sprained wrist, and it is this similarity which causes the confusion of these two conditions. This confusion is for the most part absolutely unnecessary, even in the absence of radiographic examinations.

The symptoms of sprain are pain, loss of function, swelling, tenderness and ecchymosis.

The symptoms of fracture near the joint are exactly the same, and it is only by the most painstaking examination that the two conditions may be differentiated. The differential diagnosis is based almost entirely on the character and location of the local tenderness. In sprain the tenderness is most acute over the torn ligament, and if a satisfactory history is obtainable it will be noted that the tenderness is located over some part of the ligament which was stretched by the force of the trauma. By the indirect method, tenderness is elicited by the motion of the joint which makes the torn membrane tense. This should correspond with the movement described by the hand in the causation of the sprain. Thus forcible dorsal flexion may cause a laceration of the anterior ligaments of the wrist joint (sprained wrist), and in such a case there should be direct tenderness over the anterior ligaments, and hyperextension (dorsal flexion) should cause pain referred to the anterior aspect of the wrist joint.

The same symptom (tenderness) is present in fractures near the joint, but its character and location are so distinctive as to make possible a diagnosis almost beyond question. The pain of fracture has been described by Skillern as "wincing" and by Stern as "pencil tenderness." Both names are descriptive of the type of tenderness found. If the injured bone is palpated with the finger end, or better, with the rubber end of an ordinary lead pencil, a peculiarly acute type of tenderness is elicited at the point of fracture, which almost always causes the patient to wince perceptibly. If the bone is palpated wherever its surfaces are superficial, this area of "wincing" tenderness may be mapped out and will almost always correspond definitely with the line of fracture, failing only in those cases in which there has been a trauma of the bone, due to direct violence. The duration of local tenderness in fracture is usually three or four weeks or longer, in contradistinction to sprains, in which the tenderness usually lasts only a few days to one or two weeks. The location of the "wincing" tenderness in fracture is important. Evidently it must occur not over the joint, but over the bone at the point of fracture and, characteristically, it occurs some distance from the point of trauma, in a location where tenderness would not be present in the absence of fracture.

The search for local tenderness in injuries about the wrist joint is extremely important and cannot be too greatly emphasized. Once the examiner is trained to search for this type of tenderness, the diagnosis of obscure injuries about the wrist (and other joints) becomes comparatively easy, and the number of cases of "sprained wrist" shows a corresponding decrease. If we suppose, as above, that forcible dorsal flexion has caused an injury to the wrist and a line of wincing tenderness is found about one-half inch above the wrist, there being, at the same time, only slight or moderate tenderness over the ligaments, it is evident that the lesion is not a sprain but an injury to some structure above the wrist joint. Thanks to the x-rays, we now know that these cases practically all represent linear fractures, with little or no deformity.

Radiographic examination is important in these cases, but care should be taken to interpret the plates correctly. In the presence of symptoms as described above, the fracture is usually easily detected, but there is a considerable number of cases in which the parts must be radiographed in several directions before the line of fracture can be made out. Cases occur in which repeated skiagrams fail to show fracture, but which show typical callus several weeks later. In order to emphasize the unreliability of the x-ray and the comparative importance of localized tenderness, I quote verbatim from Skillern, whose opinions I heartily endorse: "The diagnosis of an injury to the forearm should always be made by careful clinical investigation. It is a great mistake in more than one way to depend exclusively upon the skiagram. A skiagram must be considered merely as one of the many signs of fracture. There are two factors which will diagnose 90% of fractures of the forearm clinically. One is a thorough understanding of the mechanism obtained from a careful history, and the other, "wincing" tenderness. It has been shown that a given mechanism is apt to produce a certain fracture. This, in turn, indicates where to examine for "wincing" tenderness. When the site of fracture is reached, moderate pressure with a finger tip causes the patient to wince; he screws his face up and involuntarily withdraws his arm. This is almost pathognomonic of fracture."

It is impossible within the limits of this paper to do more than indicate the different varieties of fracture which are frequently confused with sprained wrist. Fractures of the lower end of the radius are the most frequent. Of these, Colles' fracture, with slight or no displacement, is probably most often seen. Longitudinal fracture of the lower end of the radius, oblique fracture (Barton's) of the lower and outer aspect of the same bone and T- and Y-shaped fractures are not uncommon. Fractures of the tip and lower end of the ulna are less common, and fractures of the scaphoid and semilunar bones are probably frequently seen but rarely diagnosed in the absence of the x-ray. Of especial interest in this connection are green-stick fracture and separation of the epiphysis in children. These conditions frequently are negative to x-ray examination and depend for their diagnoses entirely upon the history and localized tenderness. Luxation of the epiphysis without permanent displacement is frequently mistaken for sprained wrist. It is sometimes referred to as epiphyseal sprain. However, in most cases, epiphyseal separation consists of a combination of separation and

fracture of the adjacent bone. Infectious arthritis and synovitis may simulate sprained wrist, but the history and progress of the disease soon makes the diagnosis clear.

The treatment of sprained wrist depends somewhat upon the location of the injured ligament. When the dorsal or lateral ligaments are injured, a satisfactory dressing consists of strips of adhesive plaster crossing at the back of the hand and extending from the metacarpophalangeal joint to about the mid-forearm, being so applied as to limit flexion at the wrist. When the anterior ligaments are injured, which occurs only very rarely, rest and massage is the treatment of choice.

When the condition is such that the injury cannot be differentiated from fracture, it is better to consider the lesion as a fracture and to treat it accordingly. A plan which has been found satisfactory in the treatment of fractures of this type (fractures near joints without gross deformity) is fixation combined with early massage and passive motion. As such treatment is equally beneficial in sprained wrist it merits description in some detail. The wrist is fixed by means of a posterior splint extending from the knuckles to the upper third of the forearm and the patient told to return daily for massage and passive motion. The massage is begun on the second day with very gentle manipulations, the arm being stroked gently and superficially from the fingers toward the elbow, according to the method of Lucas-Championnière. Care should be taken to cause little or no pain, and to massage constantly in the same direction. As the pain diminishes, the fingers, and later the wrist joint, should be moved, at first passively and later actively, the amount of movement depending upon the subsidence of the pain and swelling. Usually ten to fifteen minutes' massage during the first day is sufficient, but the period may be lengthened to twenty-five or thirty minutes after a few days. Under this treatment there is a rapid subsidence of tenderness and swelling, if the case is sprain, but should fracture be present the improvement is more gradual and the tenderness persists even after several weeks.

In conclusion, attention should again be drawn to the importance of the early recognition of fractures near the wrist joint, and emphasis should be placed upon the fact that "sprained wrist" is a diagnosis which often serves as a cloak to hide the ignorance of the physician. The belief that "a bad sprain is worse than a break" is based upon the fact that a "bad sprain" is usually a fracture, and it is worse than a break because it is treated as a sprain and neglected as a fracture.

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A STUDY OF PEPTIC ULCER FROM THE DIAGNOSTIC POINT OF VIEW.*

BY ROSCOE H. PHILBRICK, M.D., NORTHFIELD, MASS.

IN this paper I have grouped gastric and duodenal ulcer under one heading, that of peptic ulcer, since physiologically, clinically, and pathologically, the first part of the duodenum is identical with the stomach.

In browsing through the literature, which is voluminous, I was surprised at the alleged frequency of ulcer. Mumford has stated "that of all the lesions giving rise to digestive disorders, ulcer of the stomach and duodenum holds the first place."

W. H. Welch estimated that about 5% of mankind suffer from gastric ulcer, figures founded on findings at autopsy of open or cicatrized ulcers. Some writers place the percentage much lower, while others claim much greater frequency. Mumford believed that the true percentage was probably higher than Welch's estimate.

Careful analysis shows that gastric ulcer is as common in men as it is in women, though duodenal ulcer is perhaps more frequent in males.

The most frequent age given is twenty to forty years, but an analysis of a long series of cases shows that ulcer is more liable to occur between forty and fifty. Frequently ulcer patients are over fifty, but the records show few cases under twenty. Ulcer has been found in young children.

The *conjugal condition, occupation and family history* seem to play little part, but ulcer seems to be a trifle more frequent in the negro race; and if reports from Teuton sources are correct, the Germans seem more prone to ulcer than other nationalities.

In looking over the previous history of ulcer cases, in a few instances there is a definite history of trauma. It is generally conceded that burns may lead to ulcer, especially of the duodenum, but I could find no satisfactory explanation of the circumstance. There is no doubt that arteriosclerosis, by predisposing to thrombosis, plays some part in the pathogenesis of ulcer. Syphilis may have a place in the etiology through the production of a local specific endarteritis. Endocarditis may give rise to embolism and should be considered. One investigator found, in a series of ulcer cases,

* Read at a meeting of the Franklin District Medical Society, Jan. 11, 1916.

valvular disease present in 9%. It is agreed that any chronic disease which lowers the vitality, such as tuberculosis, increases the liability to ulcer. Alcoholism may predispose. A certain percentage of cases give a previous history of chlorosis, and in a very large majority there is a definite history of "stomach trouble" persisting for months before the onset of symptoms suggesting ulcer. The majority describe it as "indigestion," as shown by discomfort after the ingestion of certain articles of food, eructations of gas and pyrosis. A study of peptic ulcer shows that the previous history of "stomach trouble" verges into the present illness without any line of demarcation. In other words, if we go back to the onset of dyspeptic symptoms, we shall know when the ulcer or ulcers started.

How do peptic ulcers form? This is a much debated question. W. J. Mayo seems to lean toward the theory of mechanical injury plus excessive acidity, while Leube says "A weak constitution, chlorosis, and anemia predispose to ulcer." Riegel states that local trophic changes take place, necrosis ensues and the dead tissue is naturally digested by the gastric juice. He believes that hyperchlorhydria (if present) is a manifestation of abnormal irritability on the part of the secretory glands of the stomach. His is the most reasonable hypothesis from my point of view.

The cardinal symptoms of ulcer are pain, vomiting and hematemesis. In Greenough's and Joslin's series of 187 cases, 96% had vomiting, 92.5% had pain and 79% had hematemesis. Pain is the predominant subjective symptom. In 50% of a series of 82 cases, pain was the chief complaint. In 47.7% "stomach trouble," dyspepsia, or vomiting were the symptoms for which relief was sought. In only 6% was the vomiting of blood voluntarily mentioned.

Only a few of the cases in this series could be termed acute, the large majority being examples of chronic ulcers existing from two months to twenty years. The usually accepted time limit, however, is from three to five years.

Pain is usually the first indication of the existence of ulcer, and is its most constant and distinctive feature, although, as we all know, pain is sometimes difficult to estimate. In ulcer cases it is usually epigastric, sometimes referred to the back, sometimes to the left shoulder blade, and rarely to either hypochondrium. In passing, it is a mistake to believe that the location of pain gives any clue to the site of the ulcer, for in 27 cases where the location of the ulcer was determined at operation or autopsy, the site of pain seemed to bear no relation to the location of the ulcer.

The pain is usually severe in character, though it may not exceed that of hyperchlorhydria; it is rarely continuous and, if so, usually denotes some complication such as localized peritonitis, adhesions or hyperchlorhydria. Pain is variously described as sharp, dull, aching, burning, colicky, gnawing or grinding, also as cutting or tearing. It is often influenced by position, usually increased by eating, but may be relieved or be entirely independent of food. Gerhardt makes the point that, while the patient would like to eat, he is often afraid to do so on account of the suffering which may ensue.

Vomiting is about as common a symptom as pain. In most cases it is frequent, in a few constant, and in others periodic. In a certain number of cases it is only occasional, following paroxysms of pain, or the ingestion of certain food. The quantity of vomitus varies, but is profuse only when there is pyloric obstruction or hypersecretion. Analysis of a series of 22 cases shows there is less liability to vomiting and pain when the ulcer involves the lesser curvature. In Howard's series pain was practically constant, except in ulcer of the pylorus or lesser curvature. Vomiting is also less frequent where ulcer is duodenal. Indeed it is stated by Moynihan that pain is the only symptom of duodenal ulcer. Ulcers involving the greater curvature or either orifice produce more constant vomiting.

Hematemesis occurred in 76% of 82 cases. Two-thirds of these had coffee ground vomitus, and one-third bright red. Of course the coffee ground vomiting occurs when the blood stays in the stomach long enough to be acted on by the gastric juice. Hematemesis often occurs more than once, and sometimes gives immediate relief to pain and vomiting.

Severe hemorrhage from an ulcer almost invariably gives bloody or tarry stools. This may not be accompanied by hematemesis when the ulcer is in the duodenum or near the pylorus. Patients are not reliable observers as to melena. The color of the blood varies according to the quantity, freshness and length of time taken to pass through the intestinal tract.

Nausea is noted in a relatively small percentage of cases, which seems natural, as vomiting is generally the result of pain, and is an attempt on the part of the stomach to get rid of irritating material. It does not usually require much effort.

There is almost invariably discomfort after eating, eructations, pyrosis, headache, palpitation and meteorism. This may be due to chronic gastritis, or attendant hyperchlorhydria.

Patients with ulcer are usually constipated, probably on account of the small amount of solids taken and retained. On the other hand, a small percentage of cases show looseness if not actual diarrhea.

There is almost invariably a loss of strength and some loss of weight, due to pain and inability to eat. Sometimes the loss of strength is due to hemorrhage. Marked loss of weight suggests cancer but it must not be forgotten that pain, coffee ground vomitus and marked loss of weight can all be present in benign ulcer of the stomach.

Tenderness is the least important of the physical signs. Its absence or presence is responsible for many errors in diagnosis. In a series

of 187 cases, it was noted in 69.5%, and the degree varied from one extreme to the other. It is usually located in the epigastrium, but may be in either hypochondrium, in the right iliac fossa, or the umbilical region.

Authorities seem to differ widely as regards demonstrable mass or resistance. In Osler's and McCrae's series, it was noted in three-fourths of the cases. In Howard's series in about one-third. Gerhardt says it may be found in any one of four conditions, namely, (1) Thickened base and hard margin of the ulcer itself; (2) functional hypertrophy of musculature; (3) localized exudate or abscess from perforation; (4) adhesions between neighboring organs.

It is estimated that the stomach is dilated in 20% of ulcer cases. Dilatation would signify pyloric obstruction; directly from the ulcer, resulting scars, or perigastric adhesions; or indirectly, from pyloric spasm.

The determination of free HCl is of value in the analysis of gastric contents, but too much importance should not be attached to it. In Howard's series, analysis of gastric contents, after a test meal, showed HCl diminished in 26%, practically normal in 27%, and increased in only 18%. It is valuable to note the contrasting results in a series of cancer cases where free HCl was absent in 92%. The relative infrequency of hyperchlohydria in ulcer cases, as shown by analyses, is somewhat contrary to the generally accepted belief, but it fits in nicely with Riegel's explanation.

Roentgenologists are, of course, enthusiastic over the advantages of their method of diagnosis and claim the ability to diagnose a large percentage of ulcer cases. Doubtless, in many instances, regional x-ray photographs, after the ingestion of a bismuth soup, would show characteristic depressions in the gastric or duodenal mucosa as well as the cicatricial contraction which follows extensive ulcers.

There is but one other laboratory test of value and that is the finding of occult blood in the stools or in the gastric contents.

The alterations in the blood are those of secondary anemia due to hemorrhage.

The urine shows nothing of interest.

Fever is present in about one-third of the cases, but does not exceed one or one and one-half degrees. It is usually not continuous and, if irregular, signifies a complication.

Of 76 cases collected by Howard, 5 had definite pyloric obstruction and two had duodenal stenosis.

In Greenough's and Joslin's series, there were 7 fatalities from hemorrhage and in Howard's cases 7.

Perforation is rather rare, Howard noting 6 cases out of 82.

Parotitis is not a rare complication. I suppose it is due to lowered resistance to bacterial invasion.

There may be almost any associated condition.

As regards diagnosis, it is not easy. Savareaud estimates that 20% of ulcers do not produce symptoms. M. C. Millet believes that every other case is undiagnosed in life.

Osler says, "The condition may be met with, accidentally, post-mortem. In other cases again, for months and years the patient has had dyspepsia, and the ulcer may not have been suspected until the occurrence of sudden hemorrhage."

H. D. Niles, in a series of 75 cases, found that in 88% the initial symptoms might easily be attributed to any mild digestive disturbance. In his series the average time from the first symptom to operation was 8 years. He believes that if a stomach ailment is of long duration, or recurs without apparent cause, it is probably due to ulcer rather than to a functional disturbance.

Moynihan says that, "hyperchlorhydria is the medical term for the surgical condition called duodenal ulcer."

The recognition of duodenal ulcer is probably more difficult than that of gastric ulcer, for there is usually less symptomatology. The patient usually states that attacks of pain have recurred for years past; sometimes daily, perhaps only once a year. During intervals patients are usually perfectly well, although they sometimes complain of persistent acid dyspepsia, or burning distress some hours after meals, often at night. Relief is obtained by taking food, or some simple antacid, like soda bicarbonate. With duodenal ulcer there is seldom any vomiting, and the physical signs are usually negative. There may be tenderness during the attack or immediately after.

In gastric ulcer troublesome dyspepsia is more likely to be persistent between attacks. The pain is usually of the same character, but is more liable immediately to follow eating. Following a test meal the stomach contents may show occult blood. In duodenal ulcer occult blood might be found in the feces, but seldom in the stomach contents. There is usually more tenderness in gastric ulcer.

In general it is very difficult to differentiate between ulcer of the duodenum and ulcer of the stomach, and it is hardly necessary. It is far more important that we recognize or differentiate between a functional disturbance of the stomach, such as acid dyspepsia and ulcer, no matter whether gastric or duodenal.

There is no single symptom or laboratory test upon which we can rely. We must depend largely on groups of symptoms, and, where after careful study the diagnosis is doubtful, resort to exploratory laparotomy.

Where the diagnosis rests between ulcer and cancer, we must remember that practically all cancer cases show absence of free HCl, accompanied by loss of appetite, and rapid emaciation, symptoms most unusual in ulcer. Differentiation is not ordinarily difficult.

It is more difficult to rule out attacks of hepatic colic. There are the same recurring seizures, possibly the same chronic dyspepsia, and in the

interval the patient is perfectly well. However, the pain is different in character, being colicky, with remissions and exacerbations coming on more suddenly and ceasing more abruptly than in ulcer. It usually starts in the epigastrium but radiates quickly to the right costal border, and around into the back underneath the right shoulder blade. The pain is not relieved by food, alkalies or vomiting. Patients with biliary colic often feel chilly, sweat profusely, are almost invariably nauseated, and vomit frequently.

In about half the cases, jaundice follows the attack. The tenderness and rigidity following the attack is at the right costal border. Occult blood does not occur in the feces unless complicated by some other condition.

If we bear in mind the frequency of peptic ulcer, and are diligent in the study of our chronic "dyspepsia" cases, we may be spared humiliation and remorse. Undoubtedly in many instances ulcer is the true diagnosis.

THE FIRST CASE IN WHICH ABDOMINAL SURGERY WAS SUGGESTED FOR THE RELIEF OF EPILEPSY.

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WITH NOTES ON THE OPERATION.

BY FRANK H. LAHEY, M.D., BOSTON,

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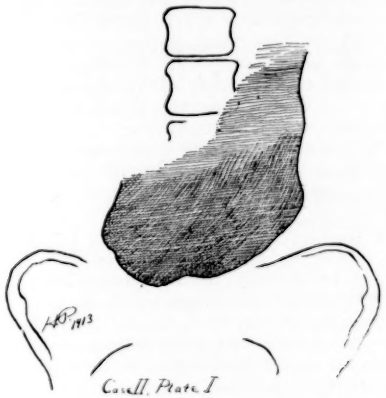
ON August 7, 1913, there was published in this JOURNAL an article entitled The Rôle of Gastric and Intestinal Stasis in Some Cases of Epilepsy. This was a report of what was probably the earliest employment of the bismuth x-ray in the study of epilepsy, and in conclusion the writer stated that he felt reinforced in his belief that in so-called idiopathic epilepsy the essential lesion was not in the nervous system. All assertions made in that article have since then been verified by others. In one of the cases, after consultation with Dr. Frank H. Lahey, it was decided to advise the patient to submit to an abdominal operation, not for the cure of constipation, but for the relief of the epilepsy. Sufficient time having elapsed, we now feel that the case may be reported.

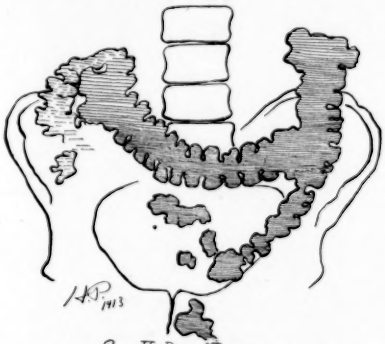
The following description of the case and the illustrations are from the original article:

"CASE 2. Male, age 23, occupation clerk. First entered clinic Feb. 15, 1911. Two paternal uncles had epilepsy. His father's grandparents were first cousins. He is a brunette like his father's family. At fifteen he had measles and shortly afterward his first epileptic seizure. The attacks have occurred about once in two or three weeks since then. They are preceded by tremor of the facial muscles, sometimes twenty-four hours beforehand. They are of grand mal type, lasting a few minutes and followed by stupor for a half hour and drowsiness for the remainder of the day. Examination was negative except for a fine tremor of the outstretched fingers. Salt-free diet and sodii bromidi gr. x t.i.d. were prescribed. Later, because of a bromide rash, Bromotone gr. v t.i.d. was prescribed. Under such treatment there was no change in the severity or frequency of the attacks. On Oct. 9, 1912, when first seen by the writer, he reported that while in New Hampshire during the summer he had been very much worse. He was then instructed in abdominal exercises and advised to use laxatives more frequently. On Jan. 27, 1913, he reported only one attack since the last visit in October, and that was on Christmas Day after dinner. On Jan. 28, 1913, the first radiograph was taken. Plate I shows the stomach much dilated and extending down into the pelvis. Plate II, after five and one-half hours, however, shows the stomach quite empty and the bismuth meal occupying part of the ileum and the colon as far as the splenic flexure. The transverse colon is far below the iliac crests and the hepatic and splenic flexures are thereby much accentuated. Plate V, after forty-eight hours, shows the transverse colon still occupied by the bismuth meal, which would be normal after twenty-eight hours. There is none in the cæcum or hepatic flexure and this points to the very low transverse colon as the cause of the stasis. Plate VI, after fifty-four and one-half hours, shows the descending colon and rectum still full, which would be normal after thirty-two hours. *In this case the possibility of relief through surgery suggests itself and this will be attempted with the patient's consent.*"

The patient at that time was a typical epileptic as described in the text-books: heavy in body and mind, unfit for any employment and discouraged. After eight years of treatment by the various bromides and by the salt-free diet, the milk and vegetable diet, *et cetera*, he had not enough confidence left in medicine to begin another course of treatment, and, after the radiographs were taken, he did not return to the hospital until September, 1914. He was then willing to submit to an operation, and on Sept. 17, 1914, a colectomy was performed by Dr. Lahey. After his recovery from the operation, he was unwilling to be placed upon a régime, but ate everything that he cared for and, after his old habit, he bolted and gormandized. Notwithstanding this, he remained free from attacks until Dec. 14, 1914. In March, 1915, he had another attack. He was then willing to submit to treatment and was placed upon a diet list published by the writer in the *Interstate Medical Journal* for December, 1914, and for some time in use in the Boston City Hospital. This diet is not vegetarian or salt-free and in it the abuse of milk is avoided. It may be briefly described as one excluding fried food, fresh white bread, pastry, beans, milk, except in moderate quantities only with meals, and uncooked fruit except oranges, figs and dates. The diet list bears a footnote directing the patient to chew thoroughly, eat slowly, never hurry after eating, never to eat too much and not to eat

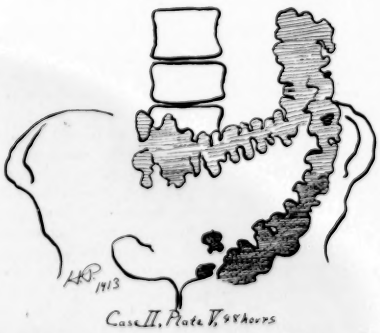


Case II, Plate I

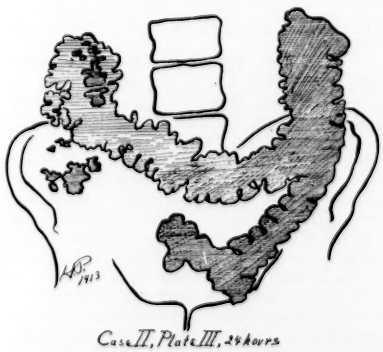


Case II, Plate IV, 30 hours

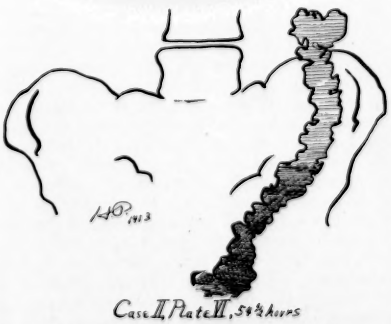
Case II, Plate II, 5½ hours



Case II, Plate V, 48 hours



Case II, Plate III, 24 hours



Case II, Plate VI, 58½ hours

for pleasure. It is based upon the facts that nearly all epileptics are bolters, nearly all are constipated and nearly all eat too much, especially of the prohibited articles. Its rationale was discussed in the article in which it was first published.* The patient, on resuming treatment, was first given:

℞ Sodii bromidi 3iiss
fl. ext. cascara 3 v
aq. ad ℥iv
Sig. 3i t.i.d.

℞ Thymol gr. iv before meals.

℞ Sodium bicarbonate gr. x when having flatulence or abdominal pain.

The bromide was discontinued June 13, 1915, and the sodium bicarbonate and cascara were discontinued in July, 1915. He has had no medicine for epilepsy since then. He has remained more than a year without an attack and without vertigo or any so-called epileptic equivalent. During that time he has been in business and he is more keen and energetic than the average individual. Moreover, his work is indoors and he has not been compelled "to find some active out-of-door pursuit." No discomfort has resulted from the operation except that he has two unformed movements daily.

We do not conclude that colectomy should be done in every case of epilepsy or in every severe case. While the colectomy undoubtedly assisted in the treatment of this case, perhaps the patient would have been relieved without the operation, had he been willing to submit to the régime upon which he was finally placed. This régime without the operation has produced equally good results in other cases. No case should be submitted to colectomy merely because it has failed to improve under bromides and a vegetarian diet. When constipation is manifest and gives way to non-surgical treatment the writer does not consider it essential to have serial radiographs made and prefers not to do so, for the reason that this procedure makes it necessary to suspend treatment for two days, sometimes causing a series of attacks. The x-ray should be used when no history of constipation can be obtained and when surgery is contemplated. Two years ago, with the coöperation of Dr. Ralph D. Leonard, radiologist, the writer undertook to determine whether or not incompetency of the ileocaecal valve were a factor in epilepsy, thinking that regurgitation into the ileum might induce the attacks. But in several cases the valve was found to be competent and distention of the caecum and colon by the high bismuth enema was followed by attacks. Therefore this work was not continued. In another of our cases in which colectomy was done, the patient became maniacal a few hours after the operation and forty-eight hours thereafter died of exhaustion. Operation in this case was resorted to because the patient would never continue treatment faithfully, was growing worse and was subject to attacks of automatism in which he endangered himself and others. Not infrequently do epileptics present symptoms of chronic appendicitis, with or without colitis, and these cases the writer believes should be submitted to whatever operation is indicated, as the first step in their treatment.

In conclusion I would urge conservatism in the employment of colectomy in epilepsy because, in my own experience, equally good results have been obtained without it, when the full coöperation of the patient and his family have been obtained; and because the too frequent resort to colectomy would eventually bring this useful measure into disrepute. It should be reserved for cases in which rational non-operative treatment, with painstaking attention to detail, directed toward the relief of the intestinal condition, has failed, and for cases in which, because of mental enfeeblement, or for other reasons, the coöperation of the patient in his treatment can not be secured.

NOTES ON THE OPERATION, BY DR. LAHEY.

It is the writer's wish to endorse what has been said by Dr. Powers in relation to conservatism in the employment of colectomy in epileptics. Regarding its curative value, only time and a number of cases can tell.

The operation itself is not an extremely difficult one, nor is it extremely dangerous. Its immediate danger arises from shock (of this there has been none in cases done by the writer) and the danger of leakage which always goes with an intestinal anastomosis. In the case cited in this paper the convalescence from the operation was even easier than from an interval appendectomy. About eight inches of the ileum, all of the caecum, ascending, transverse and descending colon were removed and the ileum anastomosed into the rectum. The caecum was extremely large and its walls considerably thinned.

As to advising the operation in epileptics, my position has been to tell the patients and their relatives frankly that there is a definite danger in the operation (although I believe it is but slight with careful technic) and that I can do the operation only if they understand that it is a last resort, and that too few cases have been done to do more than undertake it as a possible measure of relief and by no means an assured one.

In the few cases seen by me, the operation has not been considered by the patients or suggested by Dr. Powers unless they were in such condition that they were a burden to themselves and friends. In such cases it is my opinion that it is justifiable to submit them to the operation of colectomy, unproven as it is.

*Powers: "Some Observations on Diet in Epilepsy," Interstate Medical Journal, St. Louis, December, 1914.

PROLAPSUS ANI IN ADULTS.

BY T. CHITTENDEN HILL, M.D., BOSTON,

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THERE are two varieties of prolapse of the rectum that can be recognized by one familiar with these conditions. As the treatment of each differs essentially, a few words about them both will not be out of place here. The first variety is prolapsus ani or prolapsus mucosae recti. A protrusion of two inches is about the extreme amount found in this condition, and is, therefore, a point of importance in determining with which variety one is dealing. The protrusion of the mucous membrane not infrequently is limited to one side, but as a rule, both sides are protruded.

The other form of prolapse is a protrusion in which all of the coats of the bowel, including mucous, sub-mucous, muscular and, in certain aggravated cases, even the peritoneal investments, are prolapsed. This latter state is more commonly referred to as procidentia recti. It may, perhaps, be best described as a turning inside out of the lower portion of the bowel. Thus we see that it is very desirable that these two distinct varieties, which are often loosely classified together, should be clearly borne in mind, as the treatment of each is decidedly different.

In this paper I wish to confine myself to a discussion of prolapsus ani and describe a simple operation which effects a permanent cure. There are two principal reasons for calling attention to this subject.

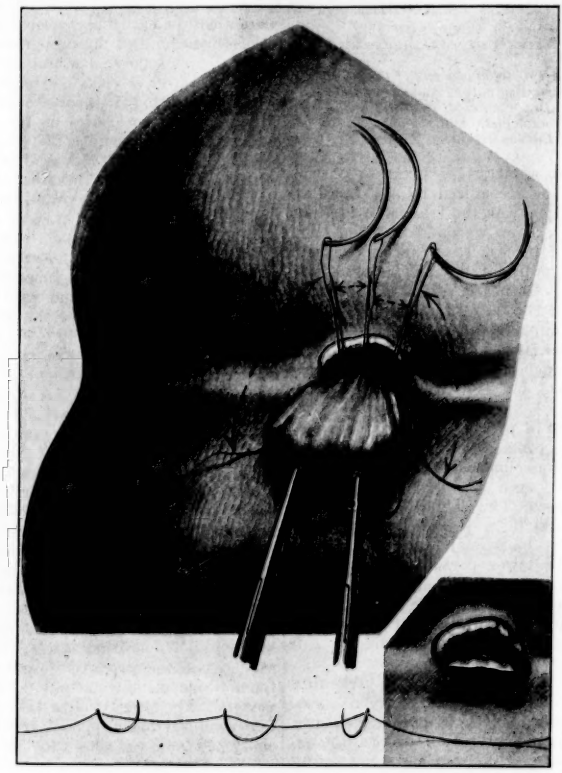
1. Practically all cases of procidentia are the result of neglect or improper treatment of what was in the beginning a simple form of mucous membrane prolapse. The mucosa is attached to the muscular wall of the rectum by a loose network of connective tissue, which normally permits a certain degree of mobility of one coat upon the other. If this mobility becomes exaggerated, whether from a general laxity of the tissues, loss of tone of the sphincters or the absence of fat in the ischio-rectal fossæ, an eversion of mucous membrane takes place. If surgical intervention is not instituted at this stage the next step may be a slipping out of the rectum in its entirety. Therefore early prophylaxis should always be insisted on.

2. Prolapsus ani occurs at all ages. It is especially common in young children, but they seldom require operative treatment. It is frequently seen in middle life, and among elderly people it is often their chief infirmity. I believe it is a great mistake to advise any of these patients, even the decrepit and aged, to be satisfied with palliative treatment, which never, at the best, affords much relief, when a safe operation can be easily performed under local anesthesia. Several of my patients have been over eighty years of age and would have been considered poor surgical risks had general anesthesia been required, but, without exception, they made quite as rapid recoveries as do much younger subjects. The importance of relieving the easily remedied defects of old age cannot be overestimated. Many of these neglected cases of rectal prolapse become practically confined to the bed or at least must assume the recumbent position the greater part of the time on account of the protrusion, which recurs when standing or walking about. Such inactivity is a severe tax upon their vitality, and will inevitably lead to an increase in the normal mortality of advanced life.

Various procedures have been recommended and are used in the treatment of this condition. Cauterization by applications of nitric acid or by linear burning with pacquelin is unreliable and, therefore, should not be employed. The removal of elliptical strips of the redundant mucous membrane with the clamp and cautery will often give satisfactory results, but it does not remove all the pathology. There are technical difficulties, as the clamp is a clumsy instrument to use without thorough divulsion of the sphincters, a procedure distinctly harmful in this class of cases. Moreover, the realization that a red hot iron is being used distresses nervous patients unless done under full surgical anesthesia. Whitehead's operation is essentially a circular excision of the prolapse followed by suturing the mucous membrane to the skin at the anal margin. My objections to this method are the loss of blood attending it, the length of time consumed and the slow and irregular healing which often ensues.

The following operation I have found best adapted for cases of prolapsus ani. The main features of this method[1] were first advocated and practised by the late Mr. Goodsall, at St. Mark's Hospital for Diseases of the Rectum, London, Eng. With certain modifications, I have now employed it with entire satisfaction for twelve years. Mr. Goodsall did not incise the mucous membrane at the muco-cutaneous junction, nor did he excise the prolapse. He applied the ligatures in the ingenious manner I shall presently describe, after which he recommended that "As soon as all the ligatures have been tied, the strangulated parts should be returned into the rectum and kept in position by a plug of cotton wool soaked in twenty per centum solution of cocaine." On the other hand, my practice has always been first to separate the mucous membrane from the skin with a shallow incision, which renders the operation less painful. Then, after the ligatures have been tied, I cut away the fold of mucous membrane so that it is quite unnecessary to plug the rectum.

[1] Goodsall and Miles: Diseases of the Anus and Rectum. Part II, page 14.



Illustrates how needles are passed through fold of mucous membrane, and dotted lines with arrow-points indicate the loops to be tied together. Three needles threaded on linen ligature, three feet long. Small illustration shows ligature tied and prolapse amputated.

The patient should be in the right lateral semi-prone position, with an assistant to support the left buttock, or in the lithotomy position. Personally, I have accustomed myself to operate with patients in the former position, and I think it is easier for them, both physically and mentally. A certain method of producing local anesthesia has been recommended for this operation, viz., blocking the pudic nerve trunk at its point of entrance into the ischio-rectal fossae. The lower rectum is enervated chiefly from the sacral plexus. Most of the nerves distributed here, such as the inferior hemorrhoidal, perineal and cutaneous are branches given off by the pudic nerve after it has entered the ischio-rectal fossae. This often proves unsuccessful, doubtless due to the fact that this region is still further supplied by certain nerves which come down through the inguinal canal, as well as others which originate independently in the coccygeal plexus. Therefore, to produce the necessary anesthesia I infiltrate the structures all around the anus to a level well above the internal sphincter. This requires from two to four ounces of 0.5% novocain. (Novocain grs. 8, adrenalin gtts. 10, normal saline solution ℥iv freshly prepared and sterilized by boiling.) The principles of this method were first described by Reclus, and have since been further elaborated by Braun. Caution should be exercised not to infiltrate within the muscular wall of the rectum, as this produces an edema of the mucosa, which renders it difficult to estimate how much should be removed at operation. If one's technic has been good the anesthesia does not involve any more discomfort than the first prick of the needle.

Anesthesia now having been accomplished, the mass, if not already protruded, is brought down by digital manipulation. The prolapsed fold of the right side is now slightly elevated, with a couple of hemostats and an incision made

with scissors at the muco-cutaneous juncture about a quarter of an inch deep. While making moderate traction in a downward direction, the three curved needles, which have been previously threaded on a linen ligature a yard long, are passed in at the line of incision and brought out at the upper part of the prolapse in the following manner. The middle needle is first passed in the centre, and the other two needles are inserted on either side of the middle one, thus dividing the fold into four equal portions. The four loops are now identified, the needles cut off, and each loop in turn tied very tightly. In this way the entire fold is completely strangulated, and as the ligatures are not interlocked, there is no occlusion of the anal canal. The operation is completed by excising a goodly portion of the mucous membrane below the ligatures, care being taken to leave enough so that they will not slip off. When the prolapse is bilateral the same procedure is carried out on the other side. It not infrequently happens that the fold on one side is much smaller than the other. In such instances one, two or three loops and, therefore, fewer needles, according to the size of the prolapse, will be found sufficient.

The bowels are moved on the second day after operation and daily thereafter with some mild aperient or cathartic. The anal region should be carefully cleansed three times daily by an experienced nurse and protected from external infection by a fluffy pad of sterile gauze. The average patient may expect to resume the activities of his normal life in a week or ten days.

Advantages of the operation.

1. It can be painlessly performed under local anesthesia, an important consideration in some of these aged debilitated patients. 2. Short operation. 3. Absence of hemorrhage. 4. The end-results are always satisfactory, and a recurrence is practically impossible. (5) This method of applying the ligatures brings about a more normal repair than any other operation. In fact, it is often impossible, after an interval of three or four months, to determine whether any operation has been performed.

ECONOMIC LOSS FROM TYPHOID AND MALARIA.—In a recent address on rural health at Washington, D. C., on July 14, Senator Ransdall of Louisiana, chairman of the Senate committee on public health, estimated the annual economic loss in the United States from typhoid fever to be $271,932,880, and that from malaria, $694,904,750, a total of $928,234,880, representing a per capita loss of $9.46 from these two diseases. These figures are impressive and doubtless are, in a sense, a measure of the preventable evil of these diseases. It is to be remembered, however, that they are open to criticism on the basis of the economic fallacies to which all such hypothetical estimates are liable.

SCIENTIFIC RESEARCH IN CHRONIC MEDICINE FROM THE PHYSIOLOGICAL POINT OF VIEW.*

THE WORK OF THE ROBERT B. BRIGHAM HOSPITAL.

BY FRANCIS H. MCCRUDDEN, M.D., S.B., BOSTON,

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MANY persons imagine that a sharp distinction can be drawn between treatment on the one hand and research on the other; that the one is intended to help the patient, the other to satisfy the idle curiosity of the doctor concerning abstract scientific problems remote from the practical needs of the individual patient. This feeling is entirely unjustified; the term scientific search implies certain intellectual methods rather than problems of any particular nature; and such methods are as applicable to the study of conditions in an individual patient as to the more abstract problems of physiology. The nature of the problems selected for study, and the direction in which clues are followed up depend on the personal interests, opportunities, and point of view of the scientific worker.

I can best bring out the significance of these statements by giving, as a concrete example of what the physiological point of view* implies in the way of research, a brief account of some of the work of the Robert B. Brigham Hospital—a hospital for chronic disease, all of whose activities are based on the striking foundation that the treatment of chronic disease is a problem of applied physiology, and that chronic disease can be successfully treated.

When this hospital† opened its doors about a year and a half ago, two widely different courses were open to those responsible for its character; they might have adopted the hopeless anatomical view of disease and founded a home in which decrepit men and women could receive shelter and food, and pass their declining days in peace—a dreary congeries of helpless and hopeless misery, with death as its goal; or they might have taken the stand that provision of this kind was already abundant, and that the broad point of view expressed in the will gave them a glorious opportunity to found a hospital for chronic disease where the outlook given by the physiological view of disease, not helplessness and hopelessness, but help and hope, were to be the guides, and an efficient life the goal. The decision that the broad, hopeful attitude should be taken, gave

* Address before the Interurban Orthopedic Club, December 31, 1915.

* See F. H. McCrudden: The Treatment of Chronic Disease Is a Problem of Applied Physiology, BOSTON MED. AND SURG. JOUR., July 13, 1916.

† Endowed under the wills of Robert and Elizabeth Brigham "for the care and support, and medical and surgical treatment, of those citizens of Boston who are without the necessary means of support, and are incapable of obtaining a comfortable livelihood by reason of chronic or incurable disease or permanent physical disability."

the community, for the first time, the benefit of a hospital where this hopeful physiological aspect of the purpose and principles of therapeutics in chronic disease is definitely emphasized.

The direction thereby given to our activities by the recognition of this great truth is shown in many ways. In the organization of the medical staff, for example, we do not have several different services—medical, surgical, orthopedic, etc.—to which patients are admitted for special treatment according to the exact anatomical nature and distribution of the lesion; but we have only one service or department; and treatment is directed at improving the functional efficiency of the patient as a whole. We have the various specialists on the staff; but an individual does not come into the hospital as an "orthopedic case," for example; he comes in as a "patient." It has been interesting to observe how the point of view is reflected, too, in the attitude of the patients; there is a distinct atmosphere of cheerfulness, hopefulness, and ambition to improve. These and other details relating to organization and administration lie outside my province; and I allude to them only to bring out the fact that the character of the scientific research—my part of the work—is but one of several phases of the work, all of which reflect our hopeful physiological point of view.

In such a hospital it is impossible to restrict ourselves to methods of treatment which have been discovered and proved out elsewhere; we must, ourselves, carry on research with the view of initiating improvement. For this purpose all necessary material facilities were afforded from the very beginning; more than this, the research work was encouraged to develop entirely free from the unnecessary restrictions and handicaps that so often discourage, hinder, and even entirely prevent such work in many institutions.

The point of view regarding purpose and principles of treatment which characterizes our hospital committed us to certain lines of research; and any tendency toward getting out of touch with problems of practical therapeutic interest—a tendency sometimes found in the case of the detached laboratory worker—has been entirely averted in our laboratory by the constant stimulus coming to us from the daily observation of patients under treatment: since the purpose of treatment in chronic disease is improvement in function rather than restoration of the anatomical integrity of diseased organs, it is clear that the research should be mainly in the field of physiology and chemistry—sciences which deal with function—rather than in the less hopeful field of anatomical pathology.

The field of scientific activities thus outlined has very wide and elastic limits; we are not restricted to any one kind of work; but our point of view does give definite form to the ideas which guide us in selecting problems, and in determining in what direction to follow clues. The problems are somewhat different from those of acute medicine, where the most important practical objects of research relate to the development of exact methods of diagnosis, the discovery of direct, specific methods of treatment, and the development and establishment of schemes of preventive medicine. One of the most important objects of research in chronic medicine concerns itself with the development of methods for a more exact measurement of functional efficiency. The details of treatment in chronic medicine depend very much on the *severity* of the disease, on the *degree* to which functional efficiency is impaired. Since scarcely a beginning has been made in methods for the exact measurement of functional efficiency, estimates of the severity of impairment of function, and of the degree of change, whether for better or worse, in the severity of the disease under any form of treatment, depend on the judgment of the physician. Judgment concerning the degree of disturbance of a function like that of the circulation, depends on estimates of the severity of the dyspnea, cyanosis, weakness on exertion, and other more subtle changes; these changes cannot be very exactly measured; estimation of their severity is subject to errors of judgment on the part of both the patient and the physician; some of them, too, may be only secondary changes and not directly proportional to the severity of the disease. Contrast with this, the situation in diabetes, a situation which is the direct result of research in biological chemistry; the severity of the disease in any particular case of diabetes is proportional to the amount of sugar which the body can oxidize; and since this can be accurately measured and stated in figures, the effectiveness of the treatment, the direction in which it is leading the patient, can be quickly, accurately, and objectively measured by determining how these figures change as the result of the treatment. The advances that have been made in the treatment of diabetes have depended entirely on our ability to measure the influence of treatment on the severity of the diabetes in this immediate, accurate, and objective manner. Innumerable other examples might be cited; in many of the more complicated cases, the direct relationship of the research problems to treatment is not so clear at first sight to one who does not understand all the factors involved. These considerations show how impossible it is to draw any line between what is simply treatment and what is scientific research; and they make clear the importance of developing methods of quickly and accurately estimating the results of treatment to replace or supplement the less exact guesses of the clinician.

The following are a few examples of investigations of this character which we already have under way. A method has recently become available for accurately determining the amount of uric acid in small quantities of blood, thus giving an opportunity for investigating the truth of the alleged relationship between uric acid and gout: we are trying to determine whether the uric acid content of the blood is high in gout; whether the

amount in the blood or the amount excreted is influenced by the attack; whether treatment—atophan treatment, radium treatment, for example—can influence these factors; and whether such treatment has any influence on the clinical condition; and, finally, whether the different clinical forms of the chronic arthropathies show any differences with respect to uric acid metabolism. The investigation has been extended to compounds other than uric acid; and we have some evidence that the creatinin metabolism may possibly be of even more importance than that of uric acid. In our studies of certain types of pernicious anemia we have become convinced that a determination, with the aid of the spectroscope, of the amount of urobilin formed from the dstroyed blood pigment and excreted, gives a more correct picture of the functional condition, the direction in which the disease is going, the severity of the disease, than the simple "snap-shots" of the status given at any one time by counts of the number of red cells and determination of the amount of hemoglobin in the blood. Investigations of the sugar content of the blood which we have under way, suggest that a decrease in the amount of blood sugar may, possibly, be of as much significance in certain conditions of muscular asthenia as an increase in blood sugar is in diabetes; the finding of a low blood sugar content in progressive muscular dystrophy suggested the use of therapeutic measures to increase the blood sugar content; such measures were followed by prompt improvement in the clinical condition. Investigations which we have been carrying out on the relation of the calcium metabolism to certain bone diseases belong also in this category. The findings in all these cases may well have a direct bearing on the etiology of the diseases in question; but ultimate etiology, like all other ultimate cause, has a way of receding as the investigator advances—the symptoms of diabetes, for example, were first found to be due to loss of sugar through the kidneys; this, in turn, being found due to high blood sugar; the high blood sugar to inability of the body to utilize sugar properly; the inability of the body to utilize sugar, to the absence of a certain enzyme; the absence of the enzyme to disease of the pancreas; discovery of the cause of the pancreatic disease will push the question of etiology one step further.* Expressed from our point of view, the findings are more significant; they are concrete examples of research intended to advance therapeutics by affording a more precise estimation of the severity of the disease, and of the effect of treatment on the severity.

Two other classes of problems peculiar to chronic medicine relate, respectively, to preventive treatment, and to the possibility of radical cure in chronic disease. The problem of *preventive treatment* is one of a different nature from that of preventive medicine in acute disease; it deals with the intrinsic rather than the extrinsic factors responsible for disease. What is to be done with persons showing congenital or acquired tendencies to different chronic diseases? Until two generations ago, it was believed that people could be classified into different types—phlegmatic, nervous, bilious, etc., and that each type has a special liability to certain definite diseases; the demonstration that infection with micro-organisms is the cause of a large proportion of acute disease; and that such infection seems to depend more on accident than on any inborn tendency, led to a shifting of the emphasis from the "soil to the seed." In recent years a further readjustment of emphasis, especially in the case of chronic disease, is bringing the question of "type," of diathesis, of the "soil" as contrasted with the "seed," again into prominence; and our physiological point of view has led us to make the facts, pointed out by the pathological anatomists, factors to be used as the basis of treatment. As an example of the kind of problem dealing with the possibility of *radical cure*: gall stones of a certain type—those composed of cholesterin—have been hitherto, even with the aid of Roentgenographic examination, often unrecognizable, and, consequently, often the cause of serious chronic disease; research carried on at the Robert B. Brigham Hospital has made it possible, in certain cases, to recognize cholesterin gall stones, so that they can be removed by surgical operation.

The problems mentioned so far are all problems peculiar to chronic medicine and problems which we have attacked with premeditated deliberation; chance, the good fortune to have suitable patients to study, has played, of course, a part in the work; but those problems were not brought to our attention by the chance occurrence of suitable cases to study; we were searching for proper patients. Another kind of problem is that coming to our attention by the chance occurrence of a case suitable for some special study, a classical example of which is familiar to everyone in the studies of gastric digestion made on the hunter Alexis St. Martin who, as the result of an accidental gunshot wound, had a permanent opening through the abdominal wall into the stomach, an opening which enabled Dr. Beaumont to study the phenomena of gastric digestion. In our hospital the long stay of patients, the excellent laboratory facilities, and the close relationship between laboratory worker and patient make this an especially fertile field. One example: in the case of a young woman upon whom colostomy had been performed, the contents of the small intestine were evacuated through the right side of the abdomen and did not pass into the large intestine; we were able to study digestion, absorption, and bacterial activity in the large and small intestine separately; and to investigate the question of the digestion and absorption of enemata in the large bowel without the usual complications resulting from the carrying down of digestive enzymes

* Every solution of a problem is a new problem.—Goethe.

from the small intestine, and to the carrying backward of the enemata into the small intestine as a result of antiperistalsis.

Studies of another kind: much valuable pathological-anatomical information is derived in most hospitals from the results of post-mortem examinations; in this hospital, the emphasis laid on physiological chemistry makes possible an extension of this kind of information so as to include chemical examination of specimens seen post-mortem. I will refer only to the data already obtained by chemical examination of bones in pathological conditions, calcified tumors, sclerosed arteries, and other pathological lime-containing material, a subject in which we are especially interested here.

Besides such problems directly attacking the border line of the known and unknown, we have had problems relating to the practical application in therapeutics of new fundamental scientific knowledge; I will refer to but one example: the application in the dietetic treatment of disease of some of the recent advances in the physiological chemistry of nutrition. The enormous amount of valuable data concerning nutrition accumulated in recent years has led to the training of dietitians and their installation in many hospitals; but even a slight acquaintance with the literature on the subject will show much criticism and great disappointment in the practical results, a disappointment that can be attributed chiefly to the failure on the part of the physician, due to lack of acquaintance with the subject, to recognize the bearing of dietetics on treatment, and make intelligent use of the facilities thus offered him. The results at this hospital have been surprisingly successful.

A problem of a still different nature relates to the mechanism and methods of actually carrying out careful and accurate scientific work in a busy hospital; of how to check and control the work—metabolism observations, for example—so as to avoid errors. In the greater part of the metabolism observations reported in the literature, nothing but the belief of the investigator is usually obtainable that the work—such an important factor even as the completeness of collection of 24-hour specimens of urine—has been carried on with accuracy and care; but even with the most reliable assistance, and with the most perfect system, such belief is of little value if not backed up by objective evidence in the form of constant creatinin excretion from day to day. In our attempts to overcome the difficulties of this problem there have been times when the question has been, not, "How to do it," but, "Can it be done?" Though to the practicing physician problems of this kind may appear abstract in their nature, remote from practical therapeutics, and therefore, the least interesting and important of the investigations, they are, as a matter of fact, very important; the correctness of the conclusions regarding any methods of treatment or the results of treatment based on laboratory findings depends on the reliability of the results; as an absolutely indispensable part of any investigation whose ultimate purpose is the advancement of therapeutics there are usually associated these tedious and time-consuming preliminary and accessory investigations whose purpose is that of establishing the integrity of the final results; like the scaffolding and the organization necessary for the construction of a building, though they do not appear in the final results, they were indispensable in its preparation. This problem has certain very important aspects that are often difficult of solution, and for which no generally applicable formula can be given; namely, those aspects relating, not to the purely scientific part of the problem, but to personal relationships, discipline, coöperation: in order to obtain reliable results it is necessary to have all the conditions under perfect control, and this necessitates a very rigid discipline in the carrying out of the work; it is necessary, on the other hand, to have the hearty coöperation of patients, nurses, and others taking part in the investigations, and this implies, what seems at first sight the opposite condition, namely, great individual freedom. This is a big subject, a discussion of which would be out of place here; but I feel confident in saying that our success in this direction is probably unequalled elsewhere.

It is impossible to give here more than a faint adumbration of the scientific work of the Robert B. Brigham Hospital; but this is sufficient to bring out an important point; namely that it is our recognition of the physiological aspect of the problem of treatment that has determined the nature of the scientific problems selected for study, and the success which we have had in attacking them. This is significant, for it justly entitles us to credit for originality in the recognition of a great truth. The facts upon which we have based our point of view have been known before; and individual physicians have adopted this point of view with respect to certain patients and even certain chronic diseases; but the bearing of the facts on the treatment of chronic disease in general has not, heretofore, been recognized *to the extent of founding an institution with this point of view as the basis for all its activities.*

This fact is a vital point in determining priority in the recognition of the truth. Priority concerning the discovery and publication of a fact—often enough, indeed, the subject of dispute— can, nevertheless, usually be determined with some degree of certainty; but a determination of the originality of a truth, a point of view, is much more difficult. If the facts upon which the point of view is based have been known, and some parts of the truth have been previously recognized, it requires no great dialectical subtlety to show, by so emphasizing these known and recognized elements, that the

whole point of view is merely a restatement of old knowledge; the important thing, however, is not the elements that go to make up the truth, but the way in which these elements are selected, arranged, and emphasized; this is a matter of synthesis; and judgment regarding the potency, vitality, and originality of the point of view so developed must rest, *not on an analysis* of the point of view into its original dead elements, *but upon the effect* resultant from adopting the point of view. Every restatement of the facts with a new arrangement and new distribution of emphasis does not establish a new truth: the deciding factor must be whether the truth as stated is a distinct entity that has, as such, a force for stimulating and directing the activities to accomplish something new; such a truth is a live and vital thing; and its power and originality must be judged by the character and extent of these stimulating, guiding, and illuminating effects. This hospital is the first hospital where the physiological point of view regarding the purpose and principles of treating chronic disease has served to guide, direct, stimulate, and illuminate all the activities and problems of the hospital.

If the brilliant medical period of the last half century may be called the "pathological-anatomical-bacteriological," the coming period, the one foreshadowed by the activities of the newer physiological chemical investigators, may be called the "functional," or "physiological-chemical" period. *And since the Robert B. Brigham Hospital gives definite recognition to this view for the first time, it is my conviction that the inauguration of the work of this hospital is one of the most important events in recent medical history.*

Clinical Department.

EPIDURAL INTRASPINAL TUMOR OF TWO YEARS' DURATION; OPERATION; RECOVERY.

By W. E. Paul, M.D., Boston.

[From the Neurological Department of the Massachusetts General Hospital.]

In a recent paper, Dr. Collins and Dr. Marks, commenting on cord tumors,* state: "Pain and other classical data are valuable but not essential phenomena.... We urge that the term atypical be discarded from the symptomatology of cord tumors. Painlessly advancing tumors are not atypical. They form a definite and important group more significant because less tangible than the classical series." The following case seems to corroborate their opinion.

* Am. Jour. of the Med. Sciences, January 15, No. 1, Vol. cxlix, p. 103.

N. T. L., a rugged woman, 43 years old, single, first noticed in November, 1913, that her feet were clumsy in walking. One night she had a backache and after it found her legs more clumsy. Soon some numbness gradually developed in her feet, and she stumbled and fell down at times; it was difficult to step up to the curbstone. Hot water was not felt by the left foot and the numbness began to increase upward in the left leg so that she did not feel the prick of a pin in it. The right leg was weak, but a pin prick and heat were recognized. There was no pain or tenderness and the sphincters were unimpaired. Some eight weeks elapsed during which the foregoing symptoms developed. On Dr. Putnam's advice, she then entered the Massachusetts General Hospital, in January, 1914. Examination showed the pupils equal and they reacted well to light and distance; the knee jerks were lively, especially the right; the position sense in the toes was normal; the ankle jerks were present; Babinski was suggested on the right but there was no clonus; the abdominal reflexes were not obtained; touch was felt everywhere without apparent loss; the temperature and pain senses were diminished throughout the left leg and left half of the trunk to a level just above the umbilicus; on the right there was also impairment of pain and temperature appreciations. The gait was notably unsteady. Both the blood and spinal fluid were negative to the Wassermann test. The x-ray revealed nothing abnormal in the vertebrae. The case was deemed a syringomyelia.

In December, 1914, N. T. L. reëntered the hospital with accentuation of her previous symptoms. The gait was more ataxic and she stumbled and fell frequently. A Babinski was present on the right. The touch sense was everywhere preserved but pain and temperature were appreciated very imperfectly up to the eighth dorsal level. She was again sent home as a case of syringomyelia.

August 3, 1915, she entered the hospital a third time and was hardly able to get about even by taking hold of chairs. She had a marked Romberg; a clonus had developed on the right and there was a double patella clonus; Babinski existed on the right only. Reinforcement brought out the Babinski and clonus.

Touch sense was preserved but pain and temperature senses were practically lost up to the sixth dorsal level. Hard pulling of the pubic hair was painless. The level of loss was somewhat higher on the left. Though touch was appreciated everywhere, the change of sensation at the sixth dorsal level was determined by the pin point as being different and less natural below this level than above it; it was not determined by sharp delimitation of pain and temperature sensibility at this level.

The spinal fluid showed as follows at the three different times she was house patient:

	Jan. 9, 1914.	December, 1914.	August, 1915.
Pressure	150	(No record)	210
Cell count	8	1	5
Noguchi	3 plus positive	Strongly positive	Strongly positive
Gold chloride	Patholog: neg. for syphilis	Syphilis	Syphilis or non-tuberculous
Alcohol	(No record)	Strongly positive	Moderately positive
Wassermann	Negative	Negative	Negative
Nonne	(No record)	Very faintly positive	Moderately positive

The objective symptoms pointed to intramedullary disease of the cord, and in the first eight weeks of the disease it was regarded as a myelitis. Later the evidence seemed to justify the view that syringomyelia existed.

At the last visit in August, 1915, the suspicion of a tumor other than gliosis was strengthened by the partial degree of spinal impairment combined with the marked level of sensory change at the sixth dorsal segment. Inasmuch as the future was hopeless if nothing were done, an exploratory laminectomy was advised. The third, fourth, fifth and sixth dorsal spines were removed and the fourth, fifth and sixth laminae, by Dr. W. J. Mixter, on August 17. A tumor presented at the fifth dorsal level protruding posteriorly and extending transversely. It was unattached except at the point of emergence of the fifth right dorsal root, and when cut free, the tumor was lifted off with the escape of considerable cerebrospinal fluid. The tumor was irregular, lobulated, 4 by 2 cm.; a cup-like depression existed in the fifth dorsal vertebra conforming to the tumor.

Dr. J. H. Wright's pathological report follows:

"An irregular spherical mass of tissue 3 cm. in greatest dimension. Microscopic examination of a paraffin section shows a tissue very rich in delicate fibrils among which are scattered rather small nuclei. The nuclei are frequently disposed in groups. The fibrils are frequently arranged in small bundles lying parallel to one another. Mallory's phosphotungstic acid haematoxylin fails to stain the fibrils blue. Fibrosarcoma."

Surgical recovery was uncomplicated and functional return was very rapid, so that at the end of eight weeks after removal of the neoplasm the use of the legs seemed practically normal and sensory restoration had taken place. The reflexes were still active but the Babinski and clonus had disappeared. I had told the patient I would be satisfied when she could hop on either foot, and she now executes a very creditable hop. Six months after the operation she states she is able to use her legs as well as ever she was.

It would be of interest to examine the progress of symptoms from cord pressure to determine whether any typical order existed. Are all the nerve tracts affected alike? Do they fail one after another with a certain order of functional block? In this case there was successive failure of tracts, and the order approximately was (1) posterior columns; (2) lateral tracts; (3) antero-lateral tracts; (4) sphincter controlling tracts. Least vulnerable were the tracts conveying touch sense. The order of severity is practically the same as that for invasion. And in keeping with the right-sided location of the tumor is the partial Brown-Séquard distribution of symptoms suggested by the greater spasticity on the right and by the greater sensory impairment on the left.

The time development of symptoms as well perhaps as the absence of subjective pain indicates the effects of the pressure were chiefly on the columnar tracts and not on the roots or commissural crossings of the temperature and pain tracts.

PATHOLOGY OF CLAVUS (SOFT CORN).

BY HENRY M. CHASE, M.D., F.A.C.S., BOSTON.

OLD DEFINITION: Small, circumscribed, horny elevation appearing upon the feet. When bathed in perspiration, they become more or less macerated and in this condition constitute the so-called soft corn.

The writer herewith presents a series of observations which will modify our interpretation of a condition which by most people is thought to belong to the care of the chiropodist; by others, as too annoying or too humiliating to discuss; by others not of sufficient magnitude to justify a medical expense.

It is a condition patiently, and as far as possible secretly, borne by most people. It is reasonably a cause of painful feet, for the origin of which search has been made elsewhere. It is a permanently curable condition.

CASE 1. J. W. Pain and redness above little toe. Thickened, moist epithelium between fourth and fifth toes. Examination shows a small infected sinus opening on one side of thickened epithelial area. Cocaine. Careful dissection of tortuous channel as outlined in Fig I A. At the bottom of the channel the glistening surface of the tendon of the plantar flexor of the little toe could be seen moving in its sheath with motion of the toe.

Fig. I B shows channel after dissection of the thickened epithelium and excision of the sinus.

Fig. I C, final cicatricial healing by granulation. Operation Nov. 14, 1912, healed Nov. 25, 1912. Now three years and four months. No recurrence.

CASE 2. W. B. A. Consultation in September, 1913, for pain about and below the external malleolus and along the fourth and fifth metatarsals, slight pronation. Pain thought to be due to static conditions, and so treated.

Not seen again for a year.

History in September, 1914. Soft corn between fourth and fifth toes for a year, apparent infection the last few days. Mild lymphangitis.

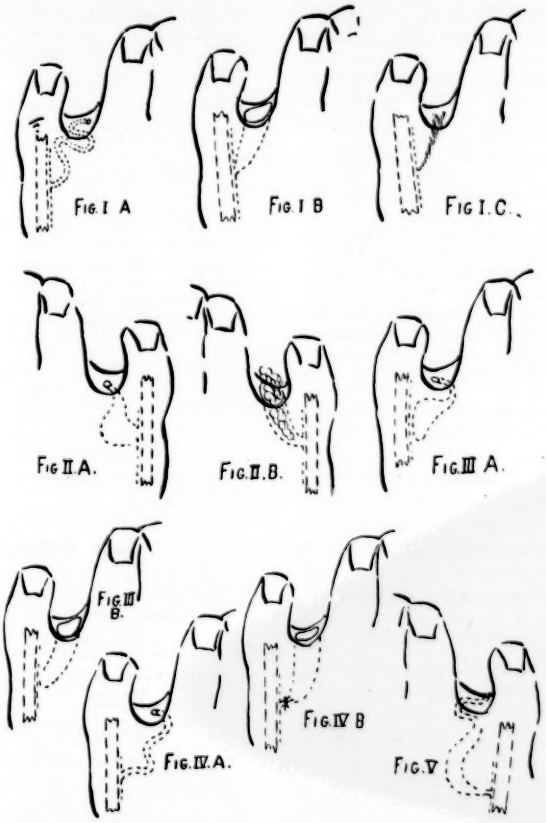
Sept. 30, 1914. Cocaine. Excision of thickened epithelium. Opening of sinus followed to dilated sac as in Fig. II A, at one side of which glistening tendon could be seen. Dilated channel not excised, wiped with carbolic and alcohol, packed with gauze (Fig. II B) followed by moderate discomfort.

Oct. 16, 1914. Escape of large amount of clear fluid (? from tendon sheath) carbolized and packed again. Followed by moderate discomfort.

Dec. 10, 1914. Cocaine. Excision of funnel-shaped channel. No carbolic, no packing. Dry gauze between toes. Plantar splint, transverse strapping of foot. No discomfort. Healed rapidly. Now one year, three months. No recurrence.

CASE 3. R. M. A. Feb. 22, 1914. Watery secretion and tenderness between fourth and fifth toes for several months.

Cocaine. Thickened epithelial surface excised and narrow funnel-shaped canal leading to dilated area adjacent and adherent to, but not apparently opening into, the plantar flexor tendon sheath of the little toe. Fig III A.



Carbolized and packed. Gauze removed in 48 hours. Fig. III B.

Sac apparently not sufficiently cauterized. Wiped with iodine, strapped and kept clean. Healed March 22, 1914. Now two years. No recurrence.

Case 4. S. A. March 15, 1915. For six years has had a soft corn between fourth and fifth toes—healing and opening. Thick macerated skin one-fourth inch in diameter on outer side of fourth toe on left foot. A depression in the centre as of opening from below. Fig IV A.

Cocaine and adrenalin. Tourniquet.

Macerated area excised and funnel-shaped sinus isolated to tendon sheath. Funnel ligated with fine iodized silk close to the tendon sheath, and excised. Wound wiped with iodine. Dry dressing. Fig. IV B.

This case had a long duration. The tie exfoliated and the wound closed to a fistulous tract secreting lymph. It was cocainized and wiped with carbolic or iodine four times as each new funnel appeared to form. It really needed to have the foot securely strapped and the toe held still. It then healed in a very few days. Now one year. No recurrence.

Case 5. M. F. (Referred by Dr. O. G. Tinkham.) March 9, 1916. Soft corn between fourth and fifth toes for three and one-half years. History of mild infection, off and on. Recently, for three weeks, tender, with lymphangitis along dorsum of foot over fourth metatarsal.

Cocaine. Bleeding controlled with pressure of hand of my associate. Probe enters opening in macerated area and demonstrates a sinus just below the epithelium. Skin excised and tortuous channel followed as outlined in Fig. V.

Funnel dissected and excised, exposing the glistening tendon of the plantar flexor.

Wound drained with small wick because of the lymphangitis. Removed in 48 hours since there was no discomfort. Foot strapped and gauze changed between the toes. Healed March 30th, 1916.

CONCLUSIONS.

Clavus, or soft corn, presents, on the surface, an area of thickened epidermis, moistened and at times macerated by discharge of lymph through an opening in the thickened area. This

opening leads through a direct or indirect tortuous channel into the subcutaneous areolar tissue.

This lymph channel may or may not connect with a tendon sheath. It varies in length, according to its tortuous direction, from one to one and one-fourth inches in depth.

In none of the cases has it been possible to probe the sinus until the thickened epidermal layer has been removed as shown by the sharp change in direction of the channel.

Treatment. Dissection and excision of the lymph sac. If wall tears and is too thin to excise, wipe with carbolic acid and insert small wick for 48 hours.

Transverse adhesive strapping the entire length of the metatarsals. Keep the toes still. Change gauze dressing as necessary, lymph secretion may be slight or excessive for several days.

Healing by granulation and permanent cure.

PISTOL-SHOT WOUND OF THE STOMACH.

BY CHARLES A. ATWOOD, M.D., TAUNTON, MASS.

Surgeon to Morton Hospital.

MARCH 9, 1916, T. G., 35 years of age, single, Italian, employed at Mount Hope Finishing Company, and residing at Taunton, got into an altercation with another Italian, A. A., who demanded that G. give up his money. This, G. refused, and A. proceeded to empty a 38-calibre revolver at G., while the latter was running away. One bullet took effect in G.'s back. G. ran several hundred yards, to the railroad station, where he fell in a collapsed condition.

He was taken to Morton Hospital, where I saw him a short time after the accident. General condition good. There is a bullet wound of entrance in left back, apparently just above left kidney region. Abdomen rigid. The bullet can be felt in the anterior abdominal wall midway between the xiphoid cartilage and the umbilicus.

The patient was immediately prepared on the table for laparotomy.

Incision made through right rectus, bullet removed and abdominal cavity opened.

The anterior wall of stomach shows wound of exit of bullet. There is also a wound (slight) of the liver. Field walled off with gauze. Wound in liver packed. Anterior wound of stomach closed with interrupted chromic gut stitches, then infolded and sewed over by Lembert continuous stitch. Opening made into cavity of great omentum between stomach and transverse colon. Stomach turned up.

I was at a loss to find posterior opening, and there was a leakage of stomach contents, with the odor of sour beer in considerable quantity. The posterior opening was found high up, at junction of esophagus and cardia. This was sutured with great difficulty. A gauze walling-off drain was inserted between liver and stomach. Another gauze below stomach and a large drain to the back of abdominal cavity.

He was put to bed in good condition.

For first week was given nothing by mouth but sips of water, and was fed with peptonized food by rectum.

Fifth or sixth day gauze removed and new wicks reinserted.

In a few days I thought there was some leakage of gas. The morning after operation the nurse reported large amount of blood in urine. I was never able to find any blood visible in urine afterwards. It is possible that the left kidney may have been wounded.

After first week patient fed by stomach. Purulent fluid was taken care of by the long drain and later by a tube.

Patient discharged with slight sinus April 29, 1916. Later in June I saw him in Court House in New Bedford in perfect health.

Book Reviews.

The Umbilicus and Its Diseases. By THOMAS STEPHEN CULLEN, Associate Professor of Gynecology in the Johns Hopkins University, Assistant Visiting Gynecologist to the Johns Hopkins Hospital. Illustrated by MAX BRÖDEL. Philadelphia and London: W. B. Saunders Company. 1916.

This monograph deals with the embryology, anatomy, and diseases of the umbilicus, together with those of the urachus. It should hardly seem, at casual thought, that there would be enough material on this subject for more than a brief treatise, yet the author has produced a large quarto of 680 pages. It constitutes a really complete survey of the literature upon the umbilicus and urachus, with the exception of umbilical hernia, and this survey is enriched with a large amount of original observation. Three-quarters of the volume are devoted to the umbilicus, one-fourth to the urachus, and the whole profusely illustrated with 269 text-figures and 7 plates, many of them original and some colored. The work is one of the best Teutonic type of thoroughness and value, written by an American in a charming and delightful English literary style unusual among physicians.

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126 Massachusetts Ave., Corner Boylston St., Boston, Massachusetts.

PREVALENCE OF POLIOMYELITIS.

DURING the past week the prevalence of poliomyelitis has diminished in New York and increased in Massachusetts. On July 22 the number of cases in New York reached a total of 2662, with 558 deaths; and in New York State, outside of New York City, 195 cases and 16 deaths had been reported.

In Massachusetts on July 23 the total number of cases since July 1 was 71, of which 8 were in Westfield, 6 in New Bedford, 5 each in North Adams and Worcester, 3 each in Fall River and Dudley, 2 each in Lowell, Lawrence, Pittsfield, Newton and Medway, and 1 each in Maynard, Marlboro, Sheffield, Greenfield, Hawley, Holyoke, Norwood, Haverhill, Boston, Greenfield, West Hanover, Raynham, Malden, Palmer, Natick, Dartmouth and Springfield.

Elsewhere in New England other new cases have been reported as follows: At Pawtucket, R. I., 4 new cases and no deaths; at Valley Falls, R. I., 1 case; at New Haven and at Bridgeport, Conn., 1 death each, and 1 new case at New Haven. The total number of cases now in Rhode Island is 22, and in Connecticut 59. Many of the New England cases are contacts from New York. Elsewhere in the United States the disease is chiefly prevalent in Illinois, where, on July 11, there was a total of 27 cases, and in New Jersey, where the total of reported cases on July 22 was 239.

In New York City extensive measures are being taken to combat the epidemic.

A conference was held at the Department of Health on July 6 to discuss, particularly, lines of investigation to be pursued during the present epidemic in order to learn more about the spread of the disease. Those present were Commissioner Emerson, Dr. William H. Park, Director of the Department's Laboratories, Dr. Louis C. Ager, Dr. George Draper of the Rockefeller Institute, Dr. Abraham Sophian, Dr. S. Josephine Baker, Director of the Department's Bureau of Child Hygiene, Dr. Josephine B. Neal and Dr. Charles Bolduan.

Commissioner Emerson reported to the Committee that he had met the Hon. William G. McAdoo, Secretary of the Treasury, at a conference at the Mayor's office, and that Secretary McAdoo had offered the services of the United States Public Health Service to the city to help stamp out the epidemic. The offer was gladly accepted and the Committee decided that the United States Public Health Service should be requested to take up especially the very difficult "carrier" problem, and should make both field epidemiological studies and laboratory studies with animal inoculations. According to the Committee, there was plenty of work in this field for at least six skilled investigators.

The laboratory investigations are very much hampered by the lack of monkeys. The Rockefeller Institute reports having over one hundred monkeys ready for shipment from the Philippine Islands, but that at present there is an embargo due to the presence on the Islands of certain animal diseases. The Committee requested Commissioner Emerson to enlist the aid of the United States Public Health Service to pass these shipments.

A letter will be sent to all large hospitals having well-equipped pathological departments, asking them to send material from fatal cases to the Health Department for examination and research study.

In pursuance of the offer of the United States Public Health Service, Secretary McAdoo, on July 11, requested from Congress an appropriation of $135,000, to finance the work in New York. This appropriation was granted, and in addition the following resolution was adopted:

"*Resolved*, That until Nov. 1, 1916, the Secretary of Labor be and he is hereby authorized in his discretion to utilize the available hospital facilities at the immigration station at Ellis Island, New York Harbor, for the purpose of housing and caring for indisposed persons from the city of New York and vicinity, under such conditions as the secretary of labor may prescribe, and without any expense to the United States Government; and all expenses for the maintenance of such buildings and damages sustained, as the result of the use thereof, shall be borne by the City or State of New York, or both."

On July 10, at Washington, D. C., a meeting was held of the general board of the Public Health Service, consisting of Surgeon-General Blue and Assistant Surgeons-General Glennan, Simpson, and Rucker. The first step taken as a result of the action of this conference was to order all railway and trolley cars entering or leaving New York City to be thoroughly cleaned and disinfected. To prevent the interstate spread of the disease will be the first aim of the work, and the second will be to undertake the scientific research into the problem of carriers and of the transmission of the disease. The United States Public Health Service has detailed the following officers to take charge of the work in New York: Dr. William C. Rucker, Dr. J. B. Stoner, Dr. Francis Edward, Dr. J. R. Ridlon, Dr. J. R. Leake, Dr. C. W. Chaplin, Dr. J. G. Wilson, Dr. R. H. Heterick, Dr. Louis Schwartz, Dr. L. L. Williams, Jr., and Dr. T. A. Hughes.

On July 15 it was announced that the Rockefeller Foundation has appropriated the sum of $50,000 as a contribution to finance the cost of combating the disease. With this money the New York Health Department has opened a new bureau, under direction of Dr. Alvah H. Doty to trace contacts and maintain a complete registry of cases.

TESTS FOR AIRMEN.

WITH the conquest of a new element, there has come a new set of medical problems arising from the action of an unfamiliar medium on the human organism. Besides the actual physical effects of alteration in the air pressure and rarefaction of the atmosphere, there are psychical effects which have been found to incapacitate many a would-be aviator. Airmen must, in fact, be picked men, especially if they are to be called upon for military duty, where, in addition to their ordinary functions, they must add those of attack and defense.

Realizing this, the French have devised a method of examination for applicants for the position of aviator, which, in addition to the ordinary physical examination which is given all recruits, comprises certain psychological tests. It is essential that the candidate's sense perceptions be in good order, so his quickness of response to auditory, visual and tactile impression is tested. Even more important, however, is the question of the stability of his emotional mechanism. He must not be unduly excitable, apprehensive or nervous.

The methods of exposing these defects seem rather spectacular, although it is probable that time will make commonplaces of many of these tests. The well-known smoked drum of the physiological laboratory is so arranged as to record the cardiac rhythm, the respiratory rhythm, the vasomotor tone, and the occurrence of muscular tremor. The candidate is then tried with unexpected noises—revolvers are fired off near him, and other loud noises made in his vicinity. Magnesium powder is ignited without warning, and searchlights flashed in his eyes to test his reaction to unexpected visual stimuli. Cold cloths are then applied suddenly to exposed parts of his skin and needles thrust into him.

The ideal candidate shows such slight reaction to these tests that his tracings show little or no change. Some candidates will react somewhat at first, until the purpose of the test is explained to them; they are then able to control their emotions completely. Other candidates show such marked tremor and irregularities in their heart action that it is considered probable that they would not be capable of handling an aeroplane in the presence of hostile forces, and these men are weeded out. Of course it is probable that some candidates are thus rejected who would not waver in the presence of actual danger, but probably the decision in most cases is a just one; certainly it is a more scientific way of going about the thing than the forming of a judgment based merely on the impression which a candidate makes on the examiner.

MORE REPORTS OF APRAXIA.

A RATHER detailed report of a case of bilateral motor apraxia by Drs. Smith and Holmes, published in the *British Medical Journal* for March 25, reminds us of the fact that accounts of this rare and interesting condition are all too infrequent. The term dates back to its use by Gogol in 1873, although the phenomenon had been described before, notably by Hughlings Jackson, Quaglino, and Fikelnberg. Recent studies have been made by Liepmann, Pick, von Monakow, d'Hollander, and Wilson. The best report which has been made in American medical literature is that of Glascock in 1913.

Too often apraxia is accompanied by such general psychic loss that the symptoms are overlooked. Such cases are found in asylums, and spoken of as being very demented, greatly deteriorated, etc. If these cases were more thoroughly investigated our knowledge of the condition would be more definite, and it would add, of course, to our knowledge of the functions of the various parts of the cortex. At present we can only say that apraxia results from a diaschisis of the left frontal area from the right frontal area.

The patient of Drs. Smith and Holmes confused yawning and whistling, was unable to use knife and fork correctly, or to shuffle cards, unable to correct the faulty position of a book handed him, showed difficulty in performing acts connected with smoking, although he was an ardent smoker, was unable to make movements of brushing his teeth or of washing his hands. There were also some disturbances of visual orientation and localization, so that he failed to appreciate the relative distance of two objects from him, and became lost in going from one part of the ward to the other.

The most disabling injuries in war are those of the skull, and these are common in trench warfare, which seems to be the approved modern method of fighting with infantry. This is due partly to the fact that the head is the most exposed part of the body in the trenches and to the frequency of enfilading fire. The more the profession learns about head injuries and their sequelae, the better will it be prepared for the exigencies of war.

MEDICAL NOTES.

PREVALENCE OF MALARIA, MENINGITIS, SMALLPOX AND TYPHOID FEVER.—The weekly report of the United States Public Health Service for July 7 states that during the month of May, 1916, there were reported in California 114 cases of malaria, 9 of cerebro-spinal meningitis, 7 of pellagra, 18 of smallpox and 121 of typhoid fever. During the same period there were 146 cases of smallpox in Iowa, and in Montana 80 cases of smallpox and 18 of typhoid.

AWARD OF VICTORIA CROSS TO A PHYSICIAN.—In the London *Gazette* of June 21 it is announced that the Victoria Cross has been awarded to Captain John Alexander Sinton, M.B., I.M.S., for most conspicuous bravery and devotion to duty. "Although shot through both arms and through the side, he refused to go to hospital, and remained, as long as daylight lasted, attending to his duties under very heavy fire. In three previous actions Captain Sinton displayed the utmost bravery."

ROCKEFELLER YELLOW FEVER COMMISSION.—On June 14 the yellow fever commission of the International Health Board of the Rockefeller Foundation, under command of General William C. Gorgas, U.S.A., sailed from New York to study sanitary conditions in the Panama Canal Zone and on the west coast of South America, particularly with reference to the prevalence of yellow fever. This commission, which consists of six members besides General Gorgas, landed, on July 12, at Lima, Peru, to investigate sanitary conditions at the Port of Iquitos.

WEIR MITCHELL MEMORIAL.—The new dispensary building of the Philadelphia Orthopedic Hospital and Infirmary for Nervous Diseases has been formally dedicated to the memory of Dr. S. Weir Mitchell, a founder of the institution and for many years chief of its hospital staff. Suitable tablets have been placed in the building, stating that it is dedicated to Dr. Mitchell's memory by his friends and patients. The dedicatory address on this occasion was delivered by Dr. William W. Keen.

HONORARY DEGREE FOR A PHYSICIAN.—At the recent convocation of the University of Chicago in celebration of its twenty-fifth anniversary, the honorary degree of ScD. was conferred on Dr. Otto K. O. Folin, Hamilton Kuhn Professor of Biological Chemistry in the Harvard Medical School.

BRAZILIAN ACADEMY OF SCIENCES.—At the May meeting of the National Academy of Sciences at Rio de Janeiro, Brazil, Dr. Tom A. Williams, of Washington, D. C., was elected corresponding member for the United States.

VARIATIONS IN COST OF DRUGS.—During the past month the prices of various drugs affected by the European War have continued to fluctuate with perhaps a general tendency to decline, owing, in certain instances, such as aspirin, to the change in seasonal demand. On June 10, 1916, crude opium sold at $11.50 a pound, antipyrin at $30.00 a pound, caffeine and phenolphthalein at $20.00 a pound and santonin at $38.00. Among the drugs which have shown the highest advance in price are antipyrin, 2700%; potassium bromide, 1150%; potassium acetate, 800%; cod liver oil, 700%; caffeine, 370%; Epsom salts, 250%; and quinine, 200%.

Report from New York on July 7 contains the following statement of market conditions of certain drug products on that date:

"Spot quotations for caffeine alkaloid were given yesterday as $16.50 to $17.50 per pound. Demand for quinine is gradually increasing, as larger quantities are required in Mexico for the troops. Sellers quote 70 and 72½ cents, the outside quotation being more general. A sharp decline is noted in oxalic acid, which has been lowered to 56 cents per pound following the larger production. Norwegian oxalic is nominal owing to scarcity. Salicylic acid was easy at $2.90. Citric and tartaric were quiet and somewhat easier."

Further report from New York on July 19 notes a recent sudden decline in the market cost of bromides, quinine, and caffeine alkaloid.

EUROPEAN WAR NOTES.

AMERICAN FIELD AMBULANCE.—Report from Paris on July 14 states that the field section of the American Ambulance Hospital at Neuilly has been separated from the main organization and established as an independent unit with 150 cars under command of A. Piatt Andrew of Gloucester, Mass., and Stephen Gallatin of New York:

"Of the cars now in service, 125 are on the Verdun front. New cars are being fitted out and young men are coming from the United States to drive them, so that by the end of August, 200 cars will be in service, or five times as many as a year ago. The field ambulance will have a suburban villa, where the drivers can rest when on furlough from the front. The unit now has its own repair stations at Billancourt, close to Paris."

SELECTION OF WOUNDED FOR TREATMENT.—A recent quotation from a French scientific journal gives some interesting facts about the manner in which great numbers of wounded soldiers are cared for by the first aid hospitals. During a period of attack when the army surgeons are called upon to care for an overwhelming number of wounded in a short space of time, those suffering from wounds in the legs are chosen first. Wounds in the body, experience has shown, are best attended to in the base hospitals and better results can be obtained if these cases are sent directly to those hospitals without preliminary operations by the stations at the front. Wounds of the arm, less likely to become seriously infected than the leg, are preferably sent to interior hospitals where every effort can be made to prevent the loss of the hand. While the ambulances of the medical department have proved adequate in every way, even for severe operations, it has been found desirable, for the psychological effect upon the patient, to perform such services beyond the firing lines and in the zones of comparative safety where the base hospitals are located.

AUSTRO-GERMAN MEDICAL CONGRESS.—The Austro-German Medical Congress, whose occurrence we noted in previous issues of the JOURNAL, was held at Warsaw from May 1 to 3, and summarized reports of it have now appeared in the German and English medical periodicals. The address of welcome was delivered by His Excellency General von Beseler, governor of Warsaw and chief of the German Army Medical Service. Professor von Schjerning then gave an account and interesting survey of the organization of the German medical service.

"There were, he said, more than 24,000 doctors in the service of the army, of whom 16,000 were actively employed at the front. Besides these, the Army Medical Service included 3000 doctors employed in Red Cross work, 400 surgeon-dentists, 1800 pharmacists, and 92,000 men in the sanitary and ambulance departments. These were assisted by 72,000 voluntary nurses, male and female, at the base hospitals, and 22,000 in the war zone. Thousands of motor-cars and vans were engaged in transporting the sick and wounded to the war hospitals, of which there were 238 in the whole country. There were also thousands of installations for the sterilization of water, for disinfection, and x-ray examinations; 26 large mobile steam laundries were kept busy day and night for the military hospitals alone; and there were 18 large disinfecting stations through which 100,000 men could be passed daily and their clothes dealt with. The central medical depot forwarded to the front daily wagon-loads of medical preparations and surgical appliances. Surgeon-General His, the President of the Congress, spoke of the successes hitherto attained in combating epidemics, asserting that 'in spite of typhus and dysentery, spotted fever and cholera, the efficiency of the troops has never been impaired.' Several scientific investigators had lost their lives during the war in combating these and other invisible enemies, amongst them Cornet, Prowazek, Lüthje, Jochmann, Römer, and Tilp. New diseases had been discovered, to one of which the name of 'five-day fever' had been

given. Well-known diseases, such as typhoid and dysentery, appeared in modified form, owing to previous inoculation."

With regard to the incidence of Asiatic cholera, an extensive statement was made by Colonel S. A. Hoffmann.

"He stated that Galicia had suffered terribly from the disease, which had also made its appearance among the German troops on the Polish frontier. The sickness rate, however, even among troops who had in the height of summer traversed the cholera-stricken Galicia and the Rokitno marshes, did not exceed 0.5%, or a quarter of the rate prevalent in the Greek army. Owing to the success of the inoculation carried on among the armies in October, 1914, only 10.2% of those attacked died, whereas the case mortality among the uninoculated troops reached the high figure of 50%. In August, 1914, cholera broke out in Warsaw, and by September it had already infected 12,000 soldiers in the Serbian army. Isolated cases had also been detected in Germany, but thanks to prophylactic measures, only 78 German civilians had contracted cholera up to January, 1916. He attributed this relative immunity of the civilian population to inoculation, which had been almost completed when, in November, 1914, the first cases of cholera appeared in the army and among Russian prisoners. He did not give the figures for the German army, but he admitted that when the Germans were advancing in the region of the Bug and the Rokitno marshes, the morbidity among the German troops was 0.52%. The mortality among those attacked by the disease, which was 50 to 35%, was reduced by inoculation to from 20 to 10%. By killing cultures at a temperature 3 to 5° C. lower than before, the resulting vaccine, even when administered twice, had been found in most cases not to provoke a troublesome reaction. Inoculation had to be repeated after half a year, as the immunity conferred did not last more than seven to nine months. In addition to inoculation, the campaign against cholera was carried out by strict hygiene, which included the prohibition of drinking unboiled water and a ceaseless war on flies. From the beginning of the war to Jan. 1, 1916, the morbidity from cholera represented only 0.065% of the average strength of the army in the field and only 0.005% of the army of occupation. He touched on the part played by carriers, and stated that in one prisoners' camp 5 out of 600 healthy men proved to be carriers. Another speaker, Dr. Schemensky, drew attention to the difference in mortality when patients were nursed in bed or on the ground; it was 30% among the former, 45% among the latter.

"Professor Kaup, representing the Austro-Hungarian army, said that after the soldiers had been inoculated the morbidity was only 1 to 5%; even when exposure to infection was great, the course of the disease was strikingly mild, and the mortality was only 0 to 20%, whereas the mortality among the uninoculated was 40 to 60%. As the immunity conferred by inoculation lasted only three to four months, it was repeated after three months if the soldiers were exposed to infection. On these occasions a single injection of 2 c.cm. of vaccine was sufficient."

WAR RELIEF FUNDS.—On July 22 the totals of the principal New England relief funds for the European War reached the following amounts:

Belgian Fund	$133,945.12
Allied Fund	125,532.00
French Wounded Fund	100,102.43
Army Hut Fund	73,351.60
British Imperial Fund	61,118.90
French Orphanage Fund	57,563.30
Armenian Fund	54,832.77
Polish Fund	54,832.77
Surgical Dressings Fund	39,433.87
Belgian Tobacco Fund	31,495.88
Facial Hospital Fund	23,135.51
Permanent Blind Fund	2,883.13

MEXICAN NOTES.

AMERICAN RED CROSS.—In connection with the mobilization of our troops on our southwestern border, the American Red Cross has undertaken to collect and distribute soldiers' gifts and other relief supplies, and the various express companies have cordially coöperated in this humanitarian work and will accept such shipments at *two-thirds* of the regular rate.

Supplies contributed should fall within the following approved list only:

Reading matter, games, comfort bags, pajamas, cotton socks (medium weight, large sizes), towels, pipes and smoking tobacco, cigarettes, electric fans (to hospitals), chewing gum, chocolate in tin boxes, hard candies, instantaneous coffee, evaporated cream, and canned fruits and other delicacies in tins.

Surgical dressings and hospital supplies will be acceptable if made according to directions in Red Cross Circular No. 115. (For copies of same, address Bureau of Supplies, American Red Cross, Washington, D.C.)

Depots for the collection and distribution of supplies have been established at various points a follows:

1. Red Cross Supply Depot, Bush Terminal No. 19, South Brooklyn, N. Y.
2. Red Cross Supply Depot, 219 East Second street, Cincinnati, Ohio.
3. Red Cross Supply Depot, Clearing, Argo District, Chicago, Ill.
4. Red Cross Supply Depot, c/o Montgomery, Ward & Co., Kansas City, Mo.
5. Red Cross Supply Depot, Denver, Colo.
6. Red Cross Supply Depot, c/o Mr. A. B. C. Dohrmann, San Francisco, Cal.

7. Red Cross Supply Depot, c/o Mayor W. H. Adamson, Douglas, Ariz.

8. Red Cross Supply Depot, 516 San Francisco street, El Paso, Texas.

9. Red Cross Supply Depot, Avenue E and Fourth Street, San Antonio, Texas.

Contributions should be *prepaid* to the appropriate depot, whence shipments will be forwarded, without further charge to the contributor, to the troops at the front.

Enquire of local express agent as to depot to which *your* supplies should be sent.

N. B. Supplies cannot be accepted which are intended to be forwarded separately to designated individuals. Those who wish to send packages to particular persons are advised to employ the parcel post or express service, such service being at *regular* rates. Supplies intended for designated companies or regiments may be accepted for forwarding with the understanding that if such delivery is found to be impracticable these supplies may be donated to other troops.

In connection with the appeal of the Chairman of the Central Committee, Mr. Taft, dated June 26, 1916, for funds for aid to our soldiers and sailors on or near the Mexican border, which appeal, it is to be regretted, has been poorly responded to, numerous letters showing splendid work done by two chapters in giving needed aid and comfort to soldiers en route to the border, and the special need of financial assistance in carrying on this good work have been received.

Press reports indicate that other Red Cross Chapters along the routes followed by the troop trains exerted themselves in like manner early and late to provide comforts and necessities for militiamen.

It is just such good, patriotic and humanitarian work as this that will cause the name of the American Red Cross to be revered by every recipient of the timely aid and comfort given by it, and it is sincerely hoped that these illustrative letters of good Red Cross work may be the means of causing such of our chapters and auxiliaries as have not had an opportunity to take part in such work, to contribute liberally toward its continuance by those chapters which are called upon to do it.

Contributions should be sent to the American Red Cross, Washington, D. C., with purposes for which they are intended plainly stated.

ARTHUR MURRAY,
Major General, U. S. A., (Retired),
Acting Chairman, Central Committee.

APPEAL FOR SURGICAL DRESSINGS.—The Surgical Dressings Committee of the National Civics Federation, which has been sending extensive supplies of surgical dressings to the Allied powers in the European War, has recently issued the following appeal for funds to enable it to undertake the additional labor of furnishing dressings for United States troops on the Mexican border:

"As a result of the sudden mobilization of the United States troops on the Mexican border, the Surgical Dressings Committee finds its field of work greatly enlarged, with constantly increasing demands upon its resources.

Further contributions are, therefore, urgently needed. Checks may be sent to the Surgical Dressings Committee, care of Old Colony Trust Company. Those wishing their subscriptions to be used exclusively for the United States troops will please mark them 'Home Relief.'

MRS. FREDERICK S. MEAD,
Chairman,
MRS. HENRY B. CHAPIN,
MRS. LIVINGSTON CUSHING,
MISS ROSE L. DEXTER,
MRS. RICHARD M. SALTONSTALL,
Acting Members Executive Committee."

CIVILIAN NURSES NEEDED.—On July 12 a call was issued from the United States War Department at Washington, D. C., for several hundred civilian nurses to join the Army Nurse Corps, to fill the six base hospitals which have been established on the Mexican border.

"There are at present approximately 3000 beds in the six hospitals. To attend these, medical regulations call for 45 nurses and one chief nurse to every 500 beds. This will necessitate the employment of 276 additional nurses.

"None but graduate nurses will be accepted by the department, and they will receive a compensation of $50 a month and maintenance and laundry during their employment. All candidates must be graduates and certified practitioners, must have studied in a school connected with a hospital containing not less than 100 beds, and pass mental and physical examination. The nurses who qualify will become members of the regular corps during manoeuvres, and later will be carried on the reserve."

MASSACHUSETTS FIELD HOSPITAL NO. 2.—In last week's issue of the JOURNAL we described the organization of the Second Massachusetts Field Hospital. On July 16 this hospital unit was mustered into Federal service as Field Hospital No. 51 of the United States Army, and will soon depart for the front. It is under command of Major (formerly Captain) Charles R. Morgan. Its other commissioned officers are Captain William M. Penny and Lieutenants Walter H. Young, Harold F. Parker and Robert F. Souther.

RELIEF FUNDS.—On July 22, the totals of the two principal relief funds for Massachusetts troops in Mexico, and their families, reached the following amounts:

Volunteer Aid Fund	$71,[illegible].44
Home Relief Fund	1,469.00

BOSTON AND NEW ENGLAND.

THE WEEK'S DEATH RATE IN BOSTON.—During the week ending July 22, 1916, there were 189 deaths reported, with a rate of 12.96 per 1000 population, as compared with 198 and a rate of 13.79 for the corresponding week of last year. There were 37 deaths under 1 year, as compared with 30 last year, and 46 deaths over 60 years of age, against 54 last year.

During the week the number of cases of principal reportable diseases were: diphtheria, 47; scarlet fever, 15; measles, 136; whooping cough, 30; typhoid fever, 5; and pulmonary tuberculosis, 61.

Included in the above were the following cases of non-residents: diphtheria, 13; scarlet fever, 2, and tuberculosis, 3.

Total deaths from these diseases were: diphtheria, 1; measles, 1; typhoid fever, 1; tuberculosis, 14.

ADAMS NERVINE ASYLUM.—The thirty-ninth annual report of the managers of the Adams Nervine Asylum states that more patients were admitted in the past year than ever before. There were 259 men and women under treatment in that time. Of this number 11 were discharged as recovered, 117 relieved, and 72 not relieved. The amount received from patients was about 38% of the expenses. While more patients were admitted, the average stay was less than in former years. Those patients who seemed not suitable for treatment, or not suffering primarily from a nervous trouble, either went home or were recommended to some other hospital. More work than ever before was done in the men's department, and the sanatorium is making an effort to acquaint the medical profession of this State with the facilities here offered for men.

CRUISE OF THE ANDROSCOGGIN.—United States Coast Guard Cutter *Androscoggin* returned on July 11 to Port of Boston from her latest cruise on the Grand Banks as a hospital ship, having made the farthest north that she has ever sailed. Many cases of sickness and incidental trauma were treated aboard the *Androscoggin* during her voyage.

HOSPITAL GIFT.—Report from New London, Conn., states that on July 14 the Lawrence Hospital of that city received an unrestricted gift of $25,000 from Mrs. Morton F. Plant. It is provided that it will be used either for a new building or for addition to the present one.

Obituary.

LOUIS AUGUSTUS WOODBURY, M.D.

DR. LOUIS AUGUSTUS WOODBURY, a descendant of John Woodbury, who came to America with the Massachusetts Colony in 1624, and a prominent practitioner of Groveland, Mass., died at his home in that town, July 18, 1916, at the age of 71 years. The son of Washington and Dolly Head (Jones) Woodbury, he was born in Salem, Oct. 1, 1844. His education was obtained in the public schools of Concord, N. H., and at the age of 18 he entered the Union Army as a member of D Company, 16th New Hampshire Volunteers, serving until the company was mustered out. Entering the Harvard Medical School, he was graduated with the class of 1871 and settled in Groveland, where he practised medicine for the rest of his life, retiring about five years ago. He became a Fellow of the Massachusetts Medical Society in 1873, his name being placed on the retired list in June of this year.

Dr. Woodbury was a member of the New Hampshire Association of Army Surgeons, the Harvard Medical Alumni Association, the Haverhill Medical Club, the New England Historic Genealogical Society, the Essex Institute, and the Society of the Sons of the American Revolution. He was a Knight Templar.

In 1869 he married Alice Chester Stanwood. She died in 1889, and he married, in 1890, Helen Ney Robinson. His widow survives him. His writings include "A Contribution to the Early History of Medicine in Haverhill," "Inscriptions from the Old Cemetery in Groveland," "Early Ministers of Bradford," and "An Historical Sketch of Bradford in the Revolution."

Miscellany.

COMMUNICABLE DISEASES.

The striking facts of the communicable disease situation for June, 1916, are the continued high mortality for measles and the low incidence of typhoid fever.

Prevalence.—The communicable diseases, prevalent in about the same amount as during June of last year, have continued to be above the five-year average for June. As was noted last month, this increase above the average for the five-year period is due to the unusual prevalence of measles.

TOTAL CASES REPORTED.

	June, 1915.	June, 1916.	Average for 5 Years, 1910-1914.
Cases	7525	7500‡	4880*
Case incidence per 100,000	204	203	139
Deaths	457*	402*	—†

Measles continues to be the most important factor in the communicable disease reports. There is very little variation between the number of cases reported last year during June and this year.

TOTAL CASES REPORTED.

	June, 1915.	June, 1916.	Average for 5 Years, 1910-1914.
Cases	4054	4186	2362
Case incidence per 100,000	110	113	67.4
Deaths	18*	42*	25.8

The center of greatest prevalence of measles has shifted during the last month. There have been fewer cases reported from Springfield and Worcester, while there has been an increase in the cases from Lowell and Fitchburg.

During June the following cities and towns have exceeded their endemic index: (Endemic index signifies the average for five years of reported cases exclusive of epidemics. This index is applied to each city and town for each month for every communicable disease.)

	Endemic Index.	Current Month.
Attleboro	1	27
Belmont	2	26
Bridgewater	2	111
Chicopee	6	47
Dartmouth	1	18
Fitchburg	11	129
Gardner	2	107
Hardwick	0	30
Holyoke	15	117
Grafton	0	24
Mansfield	1	73
Middleboro	1	44
Lowell	83	345
Newton	67	101
Palmer	1	102
Rockland	0	71
Shirley	0	92
Springfield	37	154
Warren	0	35
Williamstown	2	43
Worcester	58	242
E. Longmeadow	0	24
Brockton	33	107

Scarlet Fever shows a marked decrease, both in comparison with last month and with June, 1915. It is somewhat lower than the five-year average for the month of June.

TOTAL CASES REPORTED.

	June, 1915.	June, 1916.	Average for 5 Years, 1910-1914.
Cases	885	460	514
Case incidence per 100,000	23.9	12.5	14.6
Deaths	18*	14*	16.4

* Bulletin figures. † Figures not available ‡ Approximately.

There was a sharp decline in the number of cases of scarlet fever reported during the month of June. In Peabody there were more than the average number of cases reported, and investigation of the district health officer shows that they were due to "missed cases." The local board of health made a house-to-house inspection and has the situation under close observation.

The following cities and towns have exceeded their scarlet-fever endemic index for the month of June:

	Endemic Index.	Current Month.
Norwood	2	7
Peabody	2	18
Mendon	0	7
No. Brookfield	0	4
Holyoke	8	24

Whooping Cough has shown a slight decrease in amount, as compared with June of last year:

TOTAL CASES REPORTED.

	June, 1915.	June, 1916.	Average for 5 Years, 1910-1914.
Cases	608	537	216*
Case incidence per 100,000	16.5	14.6	6.2
Deaths	29*	11*	16

This infection was distributed over the eastern part of the state, with practically no reported case coming from districts 7 and 8. The following cities and towns have exceeded their whooping cough endemic index:

	Endemic Index.	Current Month.
Barnstable	1	8
Braintree	3	15
Brockton	9	85
Cambridge	5	29
Clinton	0	15
Lexington	1	18
Winchester	1	17
Stoughton	0	9
Fall River	7	16

Diphtheria.—There were about the same number of cases reported during June, 1916, as there were during the same month, 1915. This is considerably above the average for the five-year period. It is also a slight increase over last month.

TOTAL CASES REPORTED.

	June, 1915.	June, 1916.	Average for 5 Years, 1910-1914.
Cases	609	597	496*
Case incidence per 100,000	16.5	16.2	14.1
Deaths	35*	26*	43

The reported cases are scattered all over the state. The only points of infection of importance are Salem, Lynn, Haverhill and Oxford.

The following cities and towns have exceeded their diphtheria endemic index for the month of June:

* Bulletin figures.

	Endemic Index.	Current Month.
Somerset	0	6
Quincy	7	16
Wrentham	0	7
Salem	4	21
Lynn	12	21
Haverhill	5	19
Lawrence	4	14
Oxford	0	13
Fitchburg	4	12

Tuberculosis.—The number of cases reported to this department during June showed a decrease in number compared with the same month last year and with the five-year average for June. It would seem that, with the increased machinery that we have for the detection of this disease, we should be getting an increased number of reports:

TOTAL CASES REPORTED.

	June, 1915.	June, 1916.	Average for 5 Years, 1910-1914.
Cases	709	628	647
Case incidence per 100,000	19.2	17.1	18.3
Deaths	276*	246*	364.2

Typhoid Fever.—The low incidence of typhoid fever, noted in last month's report, continues. The number of cases reported during June is markedly lower than the same month last year and the average for the five-year period. Fall River is the only city or town that has reported above its average of this disease. Even here the increase is only a slight one:

TOTAL CASES REPORTED.

	June, 1915.	June, 1916.	Average for 5 Years, 1910-1914.
Cases	103	69	129
Case incidence per 100,000	2.8	1.9	3.7
Deaths	12*	5*	19.4

Mortality.—There were 402 deaths reported to this department during June. Of this number 246 were caused by pulmonary tuberculosis and 44 by other forms of tuberculosis. The most important other cause of death was measles, which claimed 42 persons. Diphtheria was responsible for 26 deaths while whooping cough counted for 11. There were four deaths from pellagra, 6 from cerebrospinal meningitis, 2 from tetanus and 1 from anthrax. The 5 deaths from typhoid fever, with 69 reported cases, gives a comparatively low rate.

RARE DISEASES.

Trachoma was reported from Boston (3), Fitchburg (1) and Woburn (1).

Cerebrospinal Meningitis was reported from the following places: Boston (8), Worcester (1), Fall River (1), and Cambridge (1).

Malaria was reported from Wellesley (2), Boston (3), Worcester (1), Springfield (1), and Newton (4).

* Bulletin figures.

Pellagra was reported from Peabody (1), Danvers (3), Boston (1), and Worcester (1).

Septic Sore Throat from Boston (3), and Fall River (1).

Dog-bite (reported to this department). (Those marked "+" the laboratory examination showed the brain of the dog to be positive for rabies and are being given the Pasteur treatment.)

Attleboro (1), Montague (1), Hudson (1), Lowell (1), Lawrence (3), and N. Attleboro (1).

Actinomycosis was reported from Winchendon (1).

Smallpox was reported from Fitchburg (1).

Bacillary Dysentery was reported from Natick (1).

EPIDEMICS.

The septic sore throat epidemic in Watertown subsided promptly and with the exclusion of the infected cow from the milk supply.

During the course of the month there have been five additional cases of anthrax reported to the department and distributed as follows:

Woburn (3), Winchester (1), Norwood (1). All of these individuals were handlers of hides; each one handled dried China hides at the time of infection. The preliminary report on the anthrax situation has been submitted separately.

THE FLY PROBLEM.

Two types of disease are communicated by flies: certain blood infections may be distributed by the small biting fly of the stable; a greater menace to the health of a community are the diseases which are communicated through the contamination of food by the ordinary house fly. A recent report by the United States Public Health Service describes in detail the methods by which this is effected.

In attacking this problem the greatest progress can be made by preventing the breeding of flies. It is estimated that about 80% of house flies breed in horse manure. Breeding also occurs in privy vaults, garbage and other decomposed matter. In attempting to destroy the maggots of the house fly in manure, one must bear in mind the fact that the manure will be used for fertilizing purposes, and that the application of a strong bactericide prevents the necessary decomposition of the manure and may be directly injurious to the crops. The United States Department of Agriculture in Bulletin No. 245, issued July 20, 1915, recommended powdered hellebore as a larvicide to use in treating manure. Experiments did not reveal any injurious effects upon plants from the use of considerable quantities of this substance nor were ill effects discovered upon chickens coming in contact with the treated manure.

"Powdered hellebore should be mixed with water at the rate of one-half pound to 10 gallons and the solution thoroughly stirred and allowed to stand for several hours in a barrel or other container. In order to obtain the most satisfactory results, the manure should be sprinkled with the foregoing solution immediately on removal from the barn. The sprinkling may be done with a watering can or similar device, using 10 gallons to 8 bushels of manure, taking care that all of the hellebore comes in contact with the manure and paying particular attention to the outer edges of the pile. In estimating the amount of solution to be employed it may be assumed that two bushels of manure per horse is the daily output of the stable. This is a liberal estimate, and in many stables the daily output is much less."

The use of borax for this purpose is slightly less expensive but more dangerous to plants. The directions given for its use by the Department of Agriculture are as follows:

"Apply 0.62 pound borax or 0.75 pound calcined colemanite to every 10 cubic feet (eight bushels) of manure immediately on its removal from the barn. Apply the borax particularly around the outer edges of the pile with a flour sifter or any fine sieve, and sprinkle two or three gallons of water over the borax treated manure.

"The reason for applying the borax to the fresh manure immediately after its removal from the stable is that the flies lay their eggs on the fresh manure, and borax, when it comes in contact with the eggs, prevents their hatching. As the maggots congregate at the outer edges of the pile, most of the borax should be applied there. The treatment should be repeated with each addition of fresh manure, but when the manure is kept in closed boxes less frequent application will be sufficient. Where the calcined colemanite is available, it may be used at the rate of 0.75 pound per 10 cubic feet of manure, and is a cheaper means of killing the maggots. In addition to the application of borax to horse manure to kill fly larvae, it may be applied in the same proportion to other manures, as well as to refuse and garbage. Borax may also be applied to floors and crevices in barns, stables, markets, etc., as well as to the street sweepings, and water should be added as in the treatment of horse manure. After estimating the amount of material to be treated and weighing the necessary amount of borax, a measure may be used which will hold the proper amount, thus avoiding subsequent weighings.

"Figuring borax at five to six cents per pound in hundred pound lots, and powdered hellebore at eleven cents per pound in like amounts, and estimating the amount of manure produced by one horse per day at two bushels, these methods of treatment would cost about one cent per day per horse for borax and one and one-half cents per day for hellebore. The hellebore treatment, however, is somewhat more effective, as it shows about 95% of larvicidal action as against 90% for borax. The efficiency of borax can be pushed up to about 98% by doubling the quantity used, but this would double the cost and increase the chance of injurious action on plants from the manure so treated."

Correspondence.

PREVALENCE OF TUBERCULOSIS IN MASSACHUSETTS.

BOSTON, July 20, 1916.

Mr. Editor: I note in your last issue, in the résumé of communicable diseases for May, 1916, that the looked-for increase in the number of reported cases of tuberculosis through the newly-established dispensaries is disappointing. While it is somewhat hard to explain this situation whereby the number of reported cases of tuberculosis has not increased despite the fact that a large number of new dispensaries have been opened, the situation is quite the reverse in regard to the applications on file at the office of the Trustees of Hospitals for Consumptives for our four state sanatoria. Ever since the opening of our newer sanatoria in 1910 up to the present time, during the summer months not only has the number of applications on our waiting list been a very small one, but in the case of women it has even dwindled to nothing, so that there have been vacant beds for women in some of our sanatoria. This year, despite the steady increase of beds in local tuberculosis hospitals, our waiting list is longer than ever before so that at the present time there are nearly 300 men, women and children waiting their turn for admission. It seems proper to let these facts be known in order to avoid giving the impression, which might possibly be gathered from the statement in your JOURNAL above referred to, that the medical profession are not active and wide awake to the necessity of seeking out the tuberculous and endeavoring to provide sanatorium treatment for them.

Very truly yours,

JOHN B. HAWES, 2D, M.D.,
Secretary Trustees of Massachusetts Hospitals for Consumptives.

APPOINTMENT.

Dr. Cecil Kent Drinker of the Johns Hopkins Medical School has been appointed instructor in physiology at the Harvard Medical School.

RECENT DEATH

PROFESSOR EMIL METCHNIKOFF, the celebrated French bacteriologist, died of cardiac disease at the Pasteur Institute, Paris, on July 15. He was born at Kharkoff, Russia, on May 15, 1845, and was educated at the Universities of Giessen and Munich. From 1870 to 1882 he held the position of professor of zoölogy at the University of Odessa, but in the latter year resigned to pursue private research in the anatomy of invertebrates. In 1888 he became associated with Louis Pasteur at the Pasteur Institute, and in 1895 succeeded to the position of director which he continued to hold at the time of his death. In 1908 he shared the Nobel prize for medical research with Dr. Paul Ehrlich of Berlin. He was the author of numerous scientific works, among which may be noted "The Nature of Man," "Immunity in Infective Diseases," "Prolongation of Human Life" and "Optimistic Essays."